University News

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— A Historical Perspective

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Editor :
SUTINDER SINGH

Cocurricular Activities

A Historical Perspective

S.P. Ruhela*

> *"Education has mainly two aspects, the cultural aspect which makes a person grow and the productive aspect which makes a person do things. Both are essential."*
>
> *- Jawaharlal Nehru*

Introduction

Traditionally the 3 Rs — reading, writing and arithmatic have been considered to be the be-all and end-all of school education in most schools throughout the world. However, all great educationists and educational systems have always stressed the importance of providing opportunities in schools to organize other useful activities also which are popularly known as co-curricular activities. These activities are considered to be very helpful in the maintenance of good mental health, and to ensure social, cultural, moral, aesthetic, and physical development. They provide opportunities for training in leadership, citizenship and for development of self-discipline.

The *International Dictionary of Education* (1977) has defined co-curricular activities as "Activities sponsored or recognised by a school or college which are not part of the academic curriculum but are acknowledged to be an essential part of the life of an educational institution. Cocurricular activities include sports, school bands, student newspapers etc. They may also be classed as 'extra-curricular', i.e., activities carried on outside the regular course of study; activities outside the usual duties of a job, as extra class activities "

Educational institutions in all progressive countries are now providing for cocurricular activities. If we research into the educational contributions of the educational systems and educationists of the past, we find very revealing information on the historical background of cocurricular activities.

Ancient Educational Systems

Donald A. Mackenzie's book *Ancient Civilizations From the Earliest Times to the Birth of Christ* (1992) mentions that the earliest civilizations were Egyptian civilization, Cretan civilization, Minoan civilization, Mesopotamian civilization, Sumerian civilization, Persian civilization, Indian civilization and Chinese civilization. B.C. Trigger's book *Ancient Egypt: A Social History* (1983), W.N. Weach's *History of the World* (1951) and Elizabeth Hatch's book *'Initiation'* reveal that the ancient Egyptians had Temple Schools in which the priests and nuns or priestesses under training participated in a number of activities like decoration of the temple, cleaning, gardening, preparations for ceremonies and worship etc, besides receiving their formal education in priesthood, religion, spirituality and philosophy.

All the ancient scriptures of India — Yoga Vashistha, Upanishads,

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Mahabharata, etc and Altekar's *Education in Ancient India* inform us that in the ancient Gurukuls and Ashrams of the Vedic Rishis and Gurus about 5-6 thousand years back, students were required to be actively involved in a large number of cocurricular activities like cleaning and decorating the Gurukul or the Ashram, bringing wood for the Guru, serving the Guru, taking the cows to pastures, milking the cows, training animals, wrestling, archery, dying clothes, begging alms, making various articles from locally available materials, cooking, singing, playing, warfare activities, etc. In *Chhandogya Upanishad* we find an exhaustive list of all that was studied by students in those days in India and the list includes making of perfumes, dancing, singing, playing, and other fine arts, taming elephants and horses, divination, snake charming and magic. In *Bhagavatha Purana*, there is a mention that 64 arts were learnt by students in the Gurukuls of famous Gurus like Sandipana — the Guru of Lord Krishna, Guru Dronacharya, etc.

Formal education had not properly developed in other ancient cultures like Mesopotamia, Sumeria and Persis, but their educational systems greatly emphasised the imparting of practical skills, appreciation of beauty, heroism, sacrifice, truth, love, sympathy, etc through a variety of co-curricular activities.

The History of Education in College Outline Series by Merritt M. Thompson (New York, 1933) presents a very brief yet comprehensive account of the educational ideas of great educationists and educational systems throughout the world. According to this valuable source :

(1) In ancient Greece (3500), Spartan civilization grew during 404-371 BC in which warfare, physical exercises, community service, heroic activities, archery, etc formed the cocurricular activities in the Spartan military type of schools. In the ancient Greek schools, imagination, creativity and artistic talents were developed through such activities.

(2) In the ancient Roman civilization (753-509 BC), practical skills, concrete arts and crafts and religious ceremonies were emphasised in schools as cocurricular activities.

(3) In the Dark Ages (476-1000 AD) of the History of Western Europe, the monks restored books and learning first in Italy and then in nations evolved from German tribes. In their religious schools, they emphasised a great variety of curricular activities. In the Age of Revival (1000-1492 AD) this trend continued.

(4) In the Era of Reformation (1492-1648), Era of Political Revolution (1648-1900) and in the Nineteenth Century when there was a Rise of Industrial Democracy, a number of schools, colleges and universities grew and there was transfer for control of education from Church to State. New conception of school as the agent of the State and as a universal privilege developed and in this period also the cocurricular activities received much encouragement.

(5) Almost all educators of primary importance like Plato (429-348), Aristotle (384-322), Alcuin (735-804), Vettorine Da Feltre (1378), John Sturm (1507-1589), Strassburg (1536-1582), Martin Luther of Germany (1483-1546), John Calvin of Switzerland (1509-1564), Richard Mulcaster of England (1531-1611), Francis Bacon (1561-1626), J.A. Comenius (1592-1670), Rosseau (1712-1778), J.B. Basedow (1723-1790), J.H. Pestalozzi (1746-1827), J.H. Herbart (1776-1841), Fredrich Froebel (1782-1852), Herbert Spencer (1820-1903), Horace Mann (1796-1859), American scholar Henry Bernard (1811-1900), and the most renowned American philosopher of education John Dewey (1859-1951) laid a great deal of emphasis on 'out of class actvities' like music, ceremonies, games, sports, etc in education In all the European countries and USA this was the trend, although during the 18th-19th centuries bookish education was the dominant trend.

Rosseau's revolutionary statements such as "To live is the trade I want to teach him (Emile)", "The object is not to give him knowledge but the taste and capacity for acquiring it, and the method is that of personal discovery", "Now the youth is to be educated for life with others, and is to be educated in social relationships"; clearly revealed the importance of 'out of class activities'. His ideas had a significant impact on educationists. Naturally therefore, in his philosophy of Naturalism in education, such activities had a prominent role. Pestalozzi's principle of *Anschaung* clearly focused on "the immediate experience of objects and situations" and this involved "personal contact, first-hand impressions, face-to-face knowledge, the direct impact of things and persons." This eloquently reveals his concern for cocurricular activities. Herbart emphasised 'correlation, unification, synthesis' in education, and 'exercise of self-discovery and the discipline of self-mastery' which was possible only through giving due place to cocurricular activities in the education of children.

Froebel's emphasis on the concepts such as 'self-activity on the part of the growing child', 'social participation', 'some serious activity in the production of some definite external piece of work' also meant that cocurricular activities in education could not be ignored at any cost.

Herbert Spencer (1820-1903) came out vigorously in his advocacy of cocurricular activities with his clarion call "To prepare us for complete living is the function which education has to discharge". And for making this goal an actuality he advocated activities which directly as well indirectly helped in self-preservation, activities concerned with family life and the rearing of children, social and political activities, leisure-time activities — music, arts, crafts etc.

The greatest impetus to cocurricular activities in education was provided by the greatest educational philosopher John Dewey of USA who advocated the philosophy of Pragamatism. "Education is not preparation for life, but life itself." With this assertion Dewey shook all those who had for ever been emphasising bookish education for making one's future life and career meaningful and productive. He emphasized, "Education is growth and as long as growth continues education continues". He reminded all to realise that "All education proceeds by the participation of the individual in the social consciousness of the race"; "Education is a social process and to make this possible, the school must be a democratic society"; "The occupations of the common life and industry are to be introduced not as a special subject or vocational purposes but as the centre of general curriculum." His suggestion for adopting 'Project Method' in education directly brought cocurricular activities at par with intellectual subjects in the school curriculum. Thanks to Dewey's forceful advocacy of these pragamatic ideas, no educationist and no teacher can now afford to under-rate or underplay the importance of cocurricular activities, so much so that if any one how even uses the term 'Extra curricular activities' instead of 'Cocurricular activities', he is looked down as a backward pedagogue.

French sociologist Emile Durkheim (1840-1917), who fathered Sociology of Education, considered education as nothing but the socialization of the younger generation, and advocated all such activities in education which resulted in the maximum and proper socialization of the younger generation. Karl Manneheim, another important sociologist of education, who taught in the London School of Education and was the pioneer of the modern sociology of education, advocated diversity of educational goals, variety of school subjects and school activities, active social participation and all useful, experiences which equipped one to understand, adjust in and change the society. Karl Marx's contribution to the sociology of idealogy and sociology of education lay in his great deal of emphasis on socially useful productive work activities.

Thus we see that the global trend of 'too much bookish education' that rose and held away from the 13th to 19th centuries in most of the schools and colleges, was greatly checked and corrected by these progressive educational thinkers in the later half of the previous century and in the first half of the 20th century.

Education in Modern India

Till the British came to India and became her colonial masters in the seventeenth century, in our indigenous education institutions — *tols, pathshalas, maktabas, madrasas,* and temple schools and monastry schools, students were not only involved in religious, intellectual and vocational activities, but they were also involved in all kinds of cocurricular activities like cleanliness of school campus, beautification, organising ceremonies, festivals, helping the community in fairs, festivals, social, cultural and economic activities, and in all kinds of arts, crafts, music, dance and other creative and recreative activities including wrestling, archery, use of sword, spears, horse riding, attending to animals, etc.

The British system of education with its sole emphasis on English medium, study of intellectual subjects of the Western origin, bookish learning, contempt for all oriental learning traditions and socio-cultural activities in our traditional society resulted in the deliberate destruction of all wholesome, practical or functional educational experience that was needed by our students, and that of all our subjects of oriental learning all of which had practical activities of much significance.

During the nineteenth century, all education in India became too much bookish. In *Geet Mala* — a collection of University Convocation Addresses during 1890-1940, we find how our great Indian intellectuals, national leaders and freedom fighters like

Madan Mohan Malviya, Hari Singh Gour, C.V. Raman, C.P. Ramaswami Aiyer, Dr. S. Randhakrishnan, and even Lord Curzon, the Governor General of India (while delivering his thrilling Convocation address at the University of Calcutta in 1900) had greatly lamented the banes of bookish education promoted in our schools, colleges and universities, which was devoid of the functional social experience, social consciousness, moral values and concern for the masses.

Gandhiji's system of Basic Education, which originated in 1838, emphasised the practical and pressing needs of the country and especially those of the millions of growing children of the Indian masses living in ignorance, hunger, misery and deprivations of all kinds. In the Basic Education Curriculum developed by Dr. Zakir Husain, the then Vice-Chancellor of Jamia Millia Islamia, Delhi, on the lines suggested by Gandhiji, cocurricular activities were given their due place in the form of 'Physical, Socio-cultural and Craft activities'. They were to be exploited as the very media through which pragamatic education was to be provided to the children of the Indian nation which was then striving hard to win back her national freedom.

Dewey and Gandhiji appeared on the educational firmament of Indian nation as two great sons during the most crucial decades of 1930s and 1940s with their common emphasis on pragmatism, experiential education, social participation, democracy in education, project method, correlation, etc. They made all our educationists, educational administrators and teachers acutely conscious of the importance of involving children in schools in all kinds of socio-cultural, economic and moral co-curricular activities.

All education commissions in the Post-Independence period in India — Mudaliar Commission, Radhakrishnan Commission, Kothari Commission (1964-66), Ramamurthi Committee and others have repeatedly emphasised the need of more and more cocurricular activities.

In the recent decades — 1970s, 1980s and 1990s, there has been a terrific upsurge of *anomie* (normlessness), sensate culture, social and political corruption, perversions and cultural distortations, political criminality and degeneration of the youth as a result of mass media and general trend of moral decay. Educational philosophers, spiritual Gurus and educationists are, therefore, greatly advocating cocurricular activities aimed at the development of social responsibility, moral values and humanism as well as self-sufficiency in the younger generation. In the last two decades, Sri Sathya Sai Baba has launched a vigorous value based Integral Education System in which besides education in the secular and intellectual subjects, a great deal of emphasis is being laid on activities like social service, social welfare, sports, games, village welfare, adult literacy, celebration of cultural and national fairs, festivals and events, etc. In almost all renowned schools started and run by our spiritual masters like Sri Aurobindo, Sri Chinmayananda, Sri Sadhu Vaswani, Sri Sathya Sai Baba, and organizations and communities like Bhartiya Vidhya Bhawan, Christians, Sikhs and other religions, and also in some good government and public schools, we now find that students are actively involved in a variety of cocurricular activities in order to make them conscious of human values and social responsibilities.

While all this is there, let us not be oblivious of some disappointing trends discernible in Indian education today. Most of our university departments of education and teachers' training schools and colleges are not in fact doing anything concrete by way of meaningful cocurricular activities; they only lay stress on instructional work and that too in quite a slipshod manner. They pay Lip service to cocurricular activities. In most of the schools such activities are largely ignored, especially in schools which are day schools and in whose buildings there are shift schools operating. Now cocurricular activities in most schools and colleges are becoming frivolous — beauty contests, fashion parades, youth cultural contents, National sports, dramatics, pop music, dance and the like are fast growing in which instead of learning good moral and human values and useful experiences, most of our youth are in fact learning immorality, drug use, sensuality and indiscipline.

It is high time, school and college authorities realized the immense utility of cocurricular activities and the need to organise them with seriousness, propriety and enthusiasm. All privolousness and disinterestedness must be eschewed. We are fast changing and moving towards the 21st Century and so there is need to make all our students furture-conscious. Toffler's suggestion is that every school, college and university must have a *'Council for Future'* or *'Futuristic Club'*, and *'Games of Future'* should be organised. The organization of cocurricular activities must be done not merely with a view to

(Contd. on Page 11)

MODES OF PROBLEM FINDING

Illustrative Case Discussions — II

D. Raja Ganesan[*]

Case Discussion — 2: Inventing a Problem

In the last issue we discussed how *recognising* a problem was accomplished by a maiden researcher with catalytic help from her guide. This article is a case discussion illustrating the *invention* of a problem by the author on his own. It must be recalled here that *inventing* a *potential* problem is to generate a problem from out of elements which "do not of themselves portend a problem" (Dillon 1988).

There are *latent, random* and *manifest* determinants in the invention of problems. A problem is invented when one or more of these determinants are activated. It is not possible in our vertical — strait and logical — mode of thinking (de Bono 1991) to go beyond this listing of the determinants behind inventing a problem. If it were possible to do so, then the outcome will not be a creative one — an original and surprising problem for research, but a routine and sterile inference. However, it is possible to convey a feel of the process of inventing new problems for research by "a dramatic reenactment" — to borrow Wartofsky's phrase — of it on similar occasions with as much of the surrounding details and lateral thinking that mediated among them.

Inventing of the problem area "Sleep and Education" outlined below occurred thanks to the activation of all the three types of determinants.

*** *** ***

Sleep and Education

'Sleep' and 'Education' seem to be strange bed fellows indeed! Etymologically 'education' means to 'lead out of (darkness)' and sleep is an experience of being enveloped in darkness. But formal education as it is delivered in classrooms around the world today often sends the students into sleep! Thus, 'Sleep' and 'Education' appear to be 'intimate enemies' — the former closely shadowing and seldom allowing the latter to benefit the individual fully. However, sleep is not a ruthless enemy of man or of education. Samuel Johnson rightly called sleep 'a gentle tyrant'. Being gentle sleep permits us certain freedom: and, being a tyrant it exacts, over a period of time, its due from our psychosomatic outfit.

Can education equip an individual to obtain perpetually an optimal bargain from this gentle tyrant? In other words, can education and training modify an individual's sleeping patterns so as to align them to his lifestyle and work schedule without heavy psychosomatic costs? Should there be any adult intervention in the formation of sleeping habits in the child? If so, when and how should it begin? Should every child be trained into a fixed schedule of sleep or should he be trained for high adaptability in sleeping habits?

Ongoing sleep research indicates that children sleep more and reach adult levels around the age of five, and stay put there until the onset of senescence. Any education about sleep habits must reckon with age as a major determinant. We believe, on the basis of sound common sense, that there should be parental or adult intervention in the formation of sleep habits. We can also say, on the basis of stabilisation of sleep levels at the age of five, that the intervention should begin, as a rule, at the age of five.

The sleep cycle is described as fairly stable not only in man but also in most of the mammals. However, it is also sensitive to change. It has been found that shifting of the sleeping hours to any part of the day is possible — without any major irreversible psychic or somatic damage. It has also been found that the average duration of a sleep cycle does not depend upon personality traits. That is, one's psychological make up does not entail a particular sleep schedule — like short and frequent spells or rare and long ones in the day. However, it has been found that 'poor sleepers' as against 'good sleepers' show significantly higher pathology on the Minnesota Multiphasic Personality Inventory. In other words, anybody can learn to modify his sleep cycle within limits, provided he sleeps for the minimum required number of hours per week in accordance with his age norms. Arjuna and Napoleon, cited for their legendary mastery of sleep, are not abnormal human beings, after all.

The answer to our second question, namely, whether we should inculcate in our children a fixed, uniform and

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rigid schedule of sleep or an adaptable sleeping style in terms of the hour of the day and the duration per session is now obvious: they should be adaptable, of course within limits vis-a-vis their sleeping habits.

Long before scientific sleep research was undertaken there have been systematic attempts to tame the tyrant; Religious institutions which offer residential educational programs invariably give attention to developing sound and 'well-trimmed' sleeping habits among their novices. Most of them regiment the daily schedule of the students and require every one of them to shake themselves out of sleep at exactly the same early hour of the morning everyday.

While religious and military educational institutions follow this policy as a matter of deliberate principle, lay, secular residential institutions adopt it thanks to exigencies of large numbers of inmates and scarce facilities. In both the cases individual differences are mercilessly or thoughtlessly, as the case may be, levelled down. At the other end of sleep most of the institutions endeavour to keep awake the individual upto a prescribed hour of the clock at night.

We are, however, not sure if sleeping should thus be peremptorily linked to the clock without giving cushion time to individuals to adjust marginally their hours of rest to subtle changes in their biorhythms. While we are definitely not for the lazy boys and girls to retire to bed early and to sleep on and on and on until some one wakes them up, we believe that the initiative — both for going into sleep and for waking out of it — should vest with the individual. Sound education about sleep consists in enabling the individual to acquire enough power over it within the limits set by his psychosomatic constitution.

— *Dr. D. Raja Ganesan*
(Experiments in Education,
Vol. 18, No. 4. April 1990)

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The *manifest* determinant behind the invention of this area "Sleep and Education" for research was just a commitment on the author's part to write on a new theme for educational research and/or development that has not hitherto been touched upon as far as his knowledge and memory go. The *random* determinant was his ongoing research on dreams at the time of writing this piece : He wanted to write relating *dreams* to education; but, as he recollected having already seen a book title relating dreams and education in a library catalogue he dropped it. He happened to possess on hand at that time *Handbook of Dreams: Research, Theories and Applications,* edited by Wolman (1979). This handbook had, among others, chapters relating 'sleep and dreams'. More specifically, the author chanced to glance at the opening quotation from Samuel Johnson and then at the whole state-of-the-art article, "Current Dream Research: A Psycho-biological Perspective" by Harry Fiss.

The quotation was to the effect that "no searcher has yet found either the efficient or the final cause" of this "change (into the sleep state) so frequent, so great, so general and so necessary ... And once in four and twenty hours, the gay and the gloomy, the witty and the dull, the clamorous and the silent, the busy and the idle, are all overpowered by the gentle tyrant, and all lie down in the equality of sleep". This glancing at the quotation was the *contingent* determinant.

Prompted by his individual temperament the author just thought of counter-examples — exceptions to this law of equality in susceptibility to sleep — Napoleon and Arjuna: Arjuna is characterised as one who had conqurered sleep. It is said that Napoleon would just doze off for a minute or two sitting on his horse back and would wake up refreshed and regenerated as one who had laid on bed and had a few hours of sound sleep. "How could they have conquered sleep?" as it is stated in legendary history and mythology respectively? By heredity? necessity? environment? practice? training... e - d - u - c - a - t - i - o - n? Ah, here is a new theme — new by virtue of a hitherto unattmepted conjugation, Sleep and Education, for me to elaborate on! Let me go ahead". This individual temperament of the author which prompts him to look for a counter example for every generalisation was possibly a *latent* determinant in the invention of this topic.

Perhaps, an obscure but instant association in his memory between 'Napoleon' and the phrase "benevolent despot" forged thanks to his history teacher during the author's school days and a fortunate confusion/conflation between the meanings of the words 'tyrant' and 'despot' (the semantic distinction between them has become none too clear for the author even today!) was also a latent determinant. Yes, the author had also heard about Napoleon and Arjuna — referred to in the write up above — being masters instead of slaves of sleep only from this same history teacher during the very lesson on Napoleon.

It is thus by the mediation by free association among the manifest, random, contingent and latent factors that the topic "Sleep and Education" crystallised: commitment/concern for discovery, having on hand and glancing upon potential problem cues — "no *searcher* (emphasis added) has found the ... cause ... gentle tyrant ... universal and unexceptionable" — and temperamentally proffered counter-examples: "Napoleon, gentle tyrant, benevolent despot; sleep, gentle tyrant, benevolent despot; Napoleon, sleep, conquest, will power, training, education, equality, equlity to Napoleon in sleep through education? Can we educate people, train people, to be like Napoleon in his mastery of sleep? Can education deal with sleep? ... "Sleep and Education". This is a condensed version of the free association — a form of lateral thinking — that culminated in the theme "Sleep and Education".

deBono (1971; 1991) has commended a more radical version of this line in his random word technique. This technique consists in opening arbitrarily any page of a dictionary, picking a word from it and trying to link this word through a train of associations to an unprecedented problem we are confronted with. In our case the problem that was confronting the author was inventing a new topic for research relating to education. This same theme, "Sleep and Education" would have been arrived at if the author had *accidentally* opened that page of the dictionary in which the word "sleep" is an entry, and further put his finger on that very word — again, by accident, and tried to relate it to education. It would have taken a longer time and more "squeezing" of the brain — because the contingent factor, the *Handbook on Dreams* he happened to possess, furnished a more proximate cue to the potential problem that was eventually invented. Nevertheless, the author would have slipped into the same groove of free association — of course by a *de tour* — which is already etched in his memory/neuronal networks.

One may wonder whether such random word conjugations would yield meaningful and worthwhile topics. Of course, not all random conjugation of words would yield meaninful — let alone worthwhile — topics. A conjugation of the next entry in the Pocket Oxford Dictionary (p. 495, ELBS, 1969 Edition) "Sleet" (which means falling snow mixed with rain) and "Education" is far from offering a meaninful topic for research. But such random efforts may yield now and then surprising and fruitful areas which would otherwise seldom come to our attention, if at all. In our normal course and modes of thinking our chances of focusing our conscious and deliberate attention on the relation between 'Sleep' *and* 'Education' are very remote indeed.

And there are criteria for readily recognising worthwhile topics and eventually eliminating insignificant ones. When a novel and significant topic clicks out of a conjugation we ourselves would get an 'aha' experience of pleasant surprise. As Ferrucci (1990) and deBono (1971) rightly argue, a creative person would always generate a number of ideas for picking and choosing from. We are arguing elsewhere that it will be fruitful and effective to generate many ideas for research and then select one out of them by criticism and elimination of the irrelevant ones, instead of beginning with a singular one and pursuing this. In this strategy the creative and critical modes of thinking are segregated. Thereby the mind is completely free for throwing up in the first phase even the most nonsensical and fantastic ideas. When we choose the random word technique for generating novel ideas we *ipso facto* decide not to be stultified by the sizeable quantity of nonsense it would produce.

Again, Dillon (1988) has suggested two distinct strategies aimed more specifically at inventing problems for research. They are *questioning* and *explaining*. He has further said that "a question can ask for *information* or *implication*, and it can ask about *specifics* or *patterns*. Some of the illustrative exercises he suggests for training a maiden researcher to *invent* problems for his research through questioning are : Furnishing the researcher with a page from the city telephone directory; a table of first and twelfth grade achievement test scores for various ethnic groups; a list of discoverers, their occupations and their discoveries; or, a list of the number of ministers in governments which are members of the UN: And asking him to generate questions based on each one of these documents.

"How many women are there in the given page of the telephone directory?" would be an example of a question seeking *specific information*. Similarly, "How many doctors are listed on this page?", "How many of these are men?" and "How many of them are women doctors?", would be questions that severally seek *information* that is *specific*. But a question like, "What is the proportion of men and women among the doctors?", and "What is the proportion of women doctors to the total number of women listed?", and "What is the proportion of men doctors to the total number of men listed?" "Is the percentage of doctors among the men population is less then that among women?" ask for *patterns* of information. If the percentage of women doctors is found higher an implication *might* be that women are more prone to seek medical help than men (Of course, we have assumed here that men would go only to male doctors and women to women doctors); it is, as yet, only a possibility. It must be posed as a question to be answered by further empirical field studies. In the process the other related, intervening variables — like the greater longevity of women, gender specific phenomena like pregnancy and childbirth that require medical attention — must be reckoned with.

Thus we find we are getting just in two or three steps of probing questions into a comparative study of the Health Care Needs of Men and Women. This final question — "Do Women need more health care than men? — is an implication surmised from the patterns of distribution of men and women and of doctors among them on the given page of the city telephone directory.

Similarly, from the list of ministers in governments we can raise questions about the number of ministers per million population, number of ministers per elected representative, number of ministers in relation to a standard measure of political stability — like "Is the stability of a government directly or inversely proportional to the number of ministers per representative/per million population or a function of either?" From this question the million dollar one — particularly in the contemporary Indian context — "Can we derive a formula for achieving stability and efficiency through optimising the number of ministers in a given nation?"

Of course, we have on hand only the number of ministers in the governments of these nations. But they provide cues for "second generation" questions to be answered by collecting specifiable data that should also be easily available — like the populations ot the nations and the number of elected representatives. Thence, we move on to the million dollar question for research, "What is the optimum number of ministers when stability and efficiency are the twin parameters?"

The exercises of *explaining* cited by Dillon (1988) consist in items each of which ends up requiring the subject to *explain* the perplexity posed by a *pattern* in the data. One of the examples he cites is showing the subject a map exhibiting the district-wise distribution of the achievement test scores of pupils : the distribution is not uniform. Subjects are required to write *two* explanations. Another item consists of the locale of discoveries. "Some discoveries are made in the laboratory while others are conceived in every other time and place, including while asleep and dreaming". Trainee researchers are to offer possible explanations for this distribution of the locale of discoveries between laboratories on the one hand and other places on the other.

Another type of item in this exercise is *explaining* apparent *contradictions*. For example, an inspection of the statistical data indicated that women earn the *majority* of BA's in feminine fields, but fewer MA's and a minority of the Ph.D's. The trainee researcher is to explain this reversal from the majority to the minority status proportion as the level of the degree goes up. Of course, the explanation that is offered at the initial stage would be just a hypothesis. It will have to be validated with reference to the data already available and confirmed through further data collected from the field. At the first stage of trying to offer an explanation we are just inventing the problem.

Sir C.V. Raman's discovery of the effect named after him stemmed from his noticing a contradiction hitherto overlooked: that the sky and the sea are blue in colour though air and water that fill them respectively are colourless. When he wondered why this should be so and sought to find an explanation for it he had *invented* a problem for research. It is for explaining successfully this simple but stunning contradiction that he was awarded in 1929 the Nobel Prize for Physics.

In this paper on *inventing* a problem for research we have identified *three* determinants and *two* strategies. The determinants are: *latent*, *random* and *manifest*. The two strategies are *questioning* and *explaing*. Questioning in turn consists of questioning for *information* and questioning about *implications*. The strategies — questioning and explaining — can be directed at *specifics*, *patterns* or *contradictions*. Our theme, "Sleep and Education" is an example for one that has been invented by *questioning* a contradiction: the *contradiction* between Samuel Johnson's generalisation about equality of all in susceptibility to sleep and the data about Napoleon and Arjuna being masters of sleep. It is, again, *questioning* a *contradiction* for implications one of which is educational: "How could they have conqurered sleep? By heredity? necessity? environment? practice? training? ... education?"

(Contd. on Page 11)

I Dare Kiran Bedi — A Biography

C. Parvathamma*

I read Kiran Bedi's careerography rather than A Biography *I Dare* with interest. On my way to National Police Academy, Hyderabad in September 1995 I saw this title displayed in Bangalore Airport book stall. I fell for it at once, partly because the getup is attractive, the print and language is quite good in contemporary India, but more perhaps, I was interested in woman careerist in a field that till recently remained the domain of men in India.

Kiran Bedi, the 'super-cop', the first woman IPS Officer produced in post-independence India is after all Punjabi. Her straying into police career perhaps could be linked with punjabi characteristics. In spite of being sturdy, 'punjabi psychology' seldom considered their woman as such, the exception being Kiran's family. In fact there was good deal of discrimination and girl child neglected, if not ill-treated in Punjab also.

By punjabi standards Kiran Bedi is far from being robust. She looks so 'puny', I often wondered how she managed to get into police service especially 'physical fitness test' being somewhat rigorous perhaps in contrast to other All India and foreign service cadres (IAS, IFS, so on).

Nevermind, after having chosen to enter the 'male preserve', though puny, she was proved her mettle. It is this which I would consider as a central point while considering any career woman. Would she have embarked upon bringing out a biography if she were to be an IAS or IFS officer, mid-way in her career? I doubt. Because even after completing the career not many retired IAS/ old ICS or IFS men have spared time to sit back to write an autobiography or atleast a biography.

Of course T.N. Seshan has managed to get more than one biography and he earned this fame to venture into this field as Chief Election Commissioner of the nation, when all the political parties are tired of his whimsical stances, which obstructed the designs of politicians but a much needed blessing in disguise to the citizens under constant threat and surveillance. Yet Seshan too has had his 'humble service record' while orbiting around powerful Gandhis.

Paramesh Dangwal, the author of Kiran Bedi's biography rightly or wrongly clubs these two and says that "T.N. Seshan, the Chief Election Commissioner of India, and Kiran Bedi, the Inspector General of Prisons, Delhi have done what lesser mortals would have baulked in absolute awe of the stupendous magnitude of the tasks they undertook respectively" (pp 7-8). There is no comparison for Seshan is at the fag end of his service, while Kiran is midway. Even in other respects they are not comparable. A few other retired officers who have ventured into this field have invariably tried to focus attention on inconvenient problems created and faced by them during their career. 'Those who bend' to higher authorities usually 'political bosses' have no problems, but smooth and successful career. But some who resist and function according to rules and take initiative, bring innovations, often popular with 'masses' are irksome to the powers that be. It is this category which is often made to face problems and suffer. Sex does make a difference and men would explore avenues to seek solution while for women it would be doubly difficult. I would place Kiran in this category and complement her as a 'brave cop' while traversing 23 years of her career.

Her childhood and family roots are interesting. Kiran's great-great grandfather, a pathan from Peshawar had settled in Amritsar. It was a business family, and this tradition continued even by Kiran's father under different but trying circumstances. The paternal grandfather, a patriarch, somewhat dictatorial in a way compelled Kiran's parents who strived independently — of course with Kiran's maternal grandfather's timely help — to see that their daughters did not suffer for want of encouragement. What the parents were deprived of, they wanted their daughters to achieve. Thus the achievement oriented family background with further goals, did provide the necessary motivation to Kiran and her sisters' school-college education, sports, especially laurels which she won as tennis

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player. Kiran's father is himself a good sportsman and tennis player.

Kiran was more attached to her mother and equally perhaps to her father. As it is said that she would steal a few minutes after her classes and before going to sports field or NCC and visit her mother at-home. I suspect Kiran may have been the more intelligent and active among the four sisters, hence the kind of attachment and encouragement which seem to have continued after her marriage and even as she is in active service.

After obtaining a PG degree in political science, Kiran worked as a lecturer in political science in Amritsar. After qualifying for IPS she left to join the Indian Police Service since she was more interested in carrying out jobs which were more challenging and needed grit. Women in general and some career women in particular certainly exhibit these characteristics. If Jhansi Laxmi Bai, and Kittur Rani Chennamma tried it against the British and provide historical accidents, in more recent times Mrs. Indira Gandhi exhibited it abundantly.

Her marriage with businessman Brij Bedi took place in March 1972 and Kiran was selected to IPS in July 1972. Her daughter Sukriti was born in September 1975.

Kiran joined the career with the consent and encouragement of her husband while her mother-in-law also extended her moral support to daughter-in-law till her death in 1994. Pursuit of different occupations keep husband and wife necessarily apart. The husband doing business in Amritsar and Kiran doing her career contours. More than her husband, Kiran is lucky. Marriage did not tie her down or domesticate her; though her attachment to family is second to none as is exhibited from time to time. This will be highlighted a little later.

Brij Bedi must have played the role of 'legendary husband' occasionally visiting his wife, perhaps mostly in Delhi. Kiran's natal as well as conjugal family have perhaps enjoyed an added status due to her career and achievements thereof. Kiran Bedi's parents seem to have kept company and lived with their daughter all through her service period so far. This becomes clear when they were taking care of her young daughter who had developed serious kidney trouble. Thus Kiran rushes to Delhi to take care of her ailing daughter instead of burdening her old parents and in anticipation of sanction of leave. Leave was not sanctioned but became an issue to shut her out of Goa. While her earlier posting in Goa itself was somewhat akin to punishment.

Again when she was sent to Mizoram, her parents were with her. Her father underwent an operation, for which there was hardly and facility. With deterioration of father's condition Kiran brings him back to Delhi and he gets a new lease of life. But the most serious situation that arose in the backdrop of Sukriti getting a seat in Delhi medical college against Mizoram State quota, she 'escapes' to Delhi under threatening circumstances and survives.

Granting that her career is dotted with turmoils and she was shunted from pillar-to-post, she braved all this and excelled in whatever position she was thrown in irrespective of place of posting. Barring two short period postings outside Delhi, the rest of her service is confined to Delhi in different capacities. Many laurels have come her way during the course of service. For how many officers could attain that distinction of being invited for Break-fast with a prime minister or president? That too being a woman, if she distinguishes herself through devotion to work, many eye-brows would be raised particularly by the authorities in police department and political personalities, who acquire omnipotence and think themselves above law.

Innovations in Tihar jail which received recognition outside the country and got her Ramon Magsaysay award, equally could not be swallowed easily by authorities. Kiran has to be constantly disturbed. Only under perturbed conditions she can take the challenges head on and prove herself as an efficient officer. Every turmoil is a stepping stone to success. If she improved her academic qualifications and got a Ph.D in spite of physical-mental disturbances in her service chart, there must be some extraordinary force goading her to achieve. This force, in my view, stems from her family. The emotional and moral support which Kiran has received throughout from her parents, husband, near and dear ones enabled her to withstand any amount of trouble emanating from her career source. If both home and office were to become problematic, very few people can withstand. When it is either or, it becomes possible for individuals to face, circumvent or brave over trying circumstances. Back home, Kiran is in her 'heaven', so can put up with all the trouble in her office.

One information that is missing from the book is about Kiran Bedi's friends. I suspect it to be a deliberate omission. By cordoning off her friends circle, she has been discrete. Though it is a well-known truism that an officer or anyone of her stature do not have a circle of friends with whom one can occasionally share one's joys, sorrows and problems. Certain type of information is necessarily shared between and amongst friends and not members of the family. By keeping this a guarded secret, friends are saved from public gaze. I consider this a lacunae, whatever be the reasons for withholding.

Friends and parents, of course cannot be equated. Yet friends do play very important role especially in a person's career, while parents have different roles and responsibilities. The two sets of people play complementary roles. Thus I am constrained to suggest that only partial information is provided. It would have been better if friends circle as confidants were brought in even if casually to complete the picture.

Merely following her career chart — success, failures, misery and turmoil, it reads like a diary. But looking at the facts and putting them in proper perspective, Kiran should not be looked up as the darling of the media, or publicity hungry. I do not think any sensible woman officer would fall a prey to these gimmicks, for they can easily boomerang is shorter rather than longer period to expose the hollow. A genuine career woman in any service would face problems and Kiran's diary has strengthened this. But life is much larger than a career. Why she should reject it. She sounds so dejected when she says at the end "I strive to deserve deliverance forever ! I do not want to be reborn" (P. 312). While I cannot speculate about rebirth since, what was she in her previous birth, remains unknown. Given the choice, since she is already accustomed to taking all troubles in her stride, she should feel proud and lofty about herself and her parents and husband who have provided constant support and encouraged her as something of a worthy example.

With increasing demand for women's freedom matched by almost total cruelty, the country is in need of many more Kiran Bedis. She should address herself to these larger issues than the pinpricks of a career woman. May her tribe increase!

Cocurricular Activities

(Contd. from page 4)

provide amusement but to ensure some meaningful learning in human resource development — social participation, leadership and self sufficiency. Gandhi's suggestion of achieving self sufficiency in the craft activities organised in a Basic School should be realised in its spirit; whatever activities are done by students, they should be duly guided and helped by teachers to do them with efficiency. Most teachers usually keep themselves away from cocurricular activities in their educational institutions, thinking that these 'non-academic' activities deserve to be looked after by inferior ranks of teachers, instructors or PTIs and craft teachers. This tendency must be checked immediately. In future educational scenario those teachers who confine themselves to theoretical subjects and shun cocurricular activities necessary in the changing world would not be rated as good or progressive teachers, for the whole concept of education is fast changing from 'Teacher directed education' to 'Learner-oriented education.' There are strong winds of new concepts like 'Schools without walls', 'Unconventional Learning', 'Auto Education', 'Education in Human Values', 'Education for Life', 'Education for Quality and Efficiency', etc blowing all over the educational world. Let us all therefore appreciate these novel trends and wholeheartedly support the cause of cocurricular activities, and involve ourselves with them.

Modes of Problem Finding

(Contd. from page 8)

A few exercises like these would prepare a maiden researcher to *invent* problems for his research.

[Extracts from the author's forthcoming book on Problem-Finding]

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The Green Revolution
Past Success and Future Challenges

Noble Laureate Dr. Norman E. Borlaug delivered the Convocation Address at the 34th Convocation of the Indian Agricultural Research Institute, New Delhi. He said, "The Green Revolution has had a far-reaching impact on the economic and social structures of many low-income, food-deficit nations. Many initial reporters chose to depict the Green Revolution as the wholesale transfer of technology from high yield agricultural systems to peasant farmers in the Third World. To me, however, it signified a new era in agricultural research and development in the Third World, one in which modern principles of genetics and plant breeding, agronomy, plant pathology, entomology and economics were applied to develop technologies appropriate to the conditions of local farmers." Excerpts

Historical Background

Although many know the story, permit me to briefly recount for the students the events leading up to the tremendous take-off in wheat production in India. At the political level, the key people who made this happen were Minister of Agriculture Shri C. Subramaniam and his very effective permanent secretary, Mr. Sivaraman and, of course, subsequently Prime Minister Indira Gandhi. At the scientific level, Dr. B.P. Pal, Dr. A.B. Joshi and Dr. M.S. Swaminathan, and many other scientists, including Vice Chancellor of Andhra Pradesh Agricultural University Dr. M.V. Rao, played key roles.

First, a little background. During the late 1950s and early 1960s food deficits in India had been requiring importation of 3 to 4 million tons of grain per year. However, because of a bad monsoon in 1965 and 1966, imports exploded upwardly to 10 million tons, and India was in dire straits. It was during this period that, after three years of testing on experiment stations, the so-called high-yielding Mexican wheat varieties, which had proven very interesting under experimental conditions, were considered as a possible way to break the worsening food deficit. I now fully appreciate the pressures that Shri Subramaniam was under during this period, after reading his book *The New Strategy in Indian Agriculture, the First Decade and After*, published in 1979. When he proposed a dramatic change to revitalize the national agricultural research system, and to move forward aggressively to expand food production by using the promising high-yielding Mexican wheat varieties, there were many who were in opposition not only within the research establishment, but also in other branches of the Ministry of Agriculture, other Ministries, and especially in the Planning Commission. This did not, however, dissuade Subramaniam from pushing ahead.

With preliminary data indicating the high yield potential of the Mexican semidwarf wheats, he courageously approved in 1965 the importation of 250 tons of Lerma Rojo 64 and Sonora 64, two of the new Mexican wheat varieties. (300 tons of these varieties also were imported by Pakistan.) Subramaniam encountered great opposition to this importation, especially from V.K.R.V. Rao, Planning Commission member. Many senior scientists were also against the introduction of these new Mexican wheats — partly because of fear and partly because of ego — whereas the younger scientists, who had seen them growing in the field, were very much in favour of dramatic action. Subramaniam got around the bureaucratic barriers put up to stop this importation by indicating that the seed was for on-farm trials and demonstrations, not for commercial sale.

From my side, I also was experiencing serious difficulties in getting the seed shipped from Mexico. Our whole seed multiplication program for the previous 15 years had been handled by a private farmers' cooperative in Sonora which was highly effective in producing quality seed efficiently. Unfortunately, the Mexican government's seed organization insisted on handling the wheat seed export, and therein began a series of problems that nearly terminated in the failure of the whole operation. First, there were delays in moving the fleet of about 30 large trucks across the Mexican border and to the port at Los Angeles for loading on the last freighter that would get the seed to Bombay and to Karachi in time for proper planting in mid-October. We had to pay demurrage for holding the freighter for three extra days while we were fighting the bureaucracy to get the fleet of trucks across the international border. Finally cleared, the trucks were held up by the national guard for a day, because a serious racial riot broke out in the Watts neighbourhood of Los Angeles and all traffic leading into the city was being blocked or diverted. We eventually arrived at the port on Sunday night and got the seed aboard and shipped out early Monday morning. Unfortunately, 12 hours later, war broke out between India and Pakistan. In Singapore, the seed was divided and placed in two ships, which arrived in Bombay and Karachi six weeks later than we anticipated. We were planting very late and there was no time to test for seed germination. To our dismay five days later we saw that the germination was poor. Even though the seed was very expensive, we doubled seeding rates. Although the stands that emerged were only half of what they should have been, seedlings tillered beautifully, and we added more fertilizer and water effectively. By early January it was obvious that the crop would be good.

Then, I received terrifying calls from someone in Delhi saying that the Mexican wheats were being attacked severly by stem rust. I hastened to obtain passage on the first airline to India. However, Dr. Harrar, President of the Rockefeller Foundation, told me not to go since I was too pesonally involved. Rather, he decided to send two other scientists to inspect the reported damage: Dr. Joe Ruppert, a Rockfeller Foundation employee and close friend and associate, and Dr. Harry Young, a wheat pathologist from Oklahoma State University. They travelled widely throughout the area where the Mexican wheats were growing and found no evidence of any rust. However, they did find heavy rust on one of two local Indian varieties. It appeared that "political factors" were involved in this initial unfavourable report.

Unannounced, Mr. V.K.R.V. Rao showed up in Ciudad Obregon, Sonora, Mexico, in March 1966, and said he wanted to learn more about our wheat research program. The first day we reviewed the program, the second day we visited farmers growing the new semidwarf wheats, the third day we visited the irrigation commission and farmers' seed cooperatives, the fourth day he left for India. I didn't know until months later that he was trying to make sure no errors were being made in the introduction of these huge commercial quantities of seed.

It was under these still uncertain conditions that Minister Subramaniam made a very courageous and historic decision in early 1966 to import 18,000 tons of Lerma Rojo seed from Mexico, against the advice of most of his senior scientists. This was, by far, the largest import of seed in world history. It unleashed a flood of criticism from many academicians in ivory halls around the world. Sri Subramaniam and I were charged by some critics, with recklessly playing with the lives of million of people.

For the 1966-67 season, approximately 240,000 ha were planted to the seed of Mexico varieties. When I visited India in March of 1967, everywhere Dr. Swaminathan, the late Dr. R. Glenn Anderson of the Rockefeller Foundation, and I travelled, we encountered tremendous enthusiasm — indeed euphoria — among all farmers — large and small — for the new wheat varieties. When we returned, I reported on this to Mr. Subramaniam, insisting that all that was necessary now was to have assurance of availability of fertilizer, credit to buy the fertilizer at time of planting and pay for it at harvest, and a fair price for the grain at harvest which would approach the price of wheat at international market. Subramaniam held up his arms and said "you've forgotten I can't help you with this because I lost my seat in the Lok Saba in last month's elections and I am out of office at midnight tomorrow, March 31st." This threw a blanket of gloom over our whole program. He insisted that I see Ashok Mehta, Deputy Chairman of the Planning Commission, and Minister of Heavy Industry and Petro-Chemicals, before I left India the next day. An appointment was made and Swaminathan and I went to see Ashok Mehta at six o'clock in the afternoon on March 31st. The discussion was probably, according to Subramaniam, the most important hour of my scientific life, for it led to changes in policy. It began very stormily as I talked about the need to dramatically change India's disastrous agricultural policies on fertilizer, credit and grain prices. He was indignant. A flood of loud angry words were emitted by both of us until we both ran out of breath and began to talk in rational tones again.

Ashok Mehta bluntly said that India did not have the foreign exchange to expand fertilizer imports greatly, much less invest in large fertilizer manufacturing complexes. I countered by saying that the development of a fertilizer industry, and of the agricultural sector in general, was of a higher order of priority than the large capital investments being made in other sectors, since fertilizer was essential for increasing food production. Moreover, I emphasized it was a risk for India to continue to rely, for a large amount of its essential food, on imports under concessional sale PL 480 contracts from the United States. These types of contracts could be cut off either by unavailability or shortages by the supplier or by shifts in political winds. Ashok Mehta knew all too well about the "political winds" of which I spoke, since U.S. President Lyndon Johnson was using food aid to increase the pressure on the Government of India to support the Vietnam policy of his administration.

I left for Mexico four hours after our meetinng. Two weeks later, I received a series of clippings from the major New Delhi newspapers, dated April 1st, disclosing that the Government had revalidated all uncompleted contracts for constructing fertilizer factories, which would have been voided, as of midnight March 31st. Moreover, the Government also embarked on a program to greatly increase fertilizer importation in the short-run. These were drastic changes in fertilizer policy.

In October 1967, Prime Minister Indira Gandhi lent her prestige to the wheat campaign by spading-up the flower bed in front of the Prime Minister's residence and planting the new wheats, which developed beautifully. Moreover, at her insistence, all professors in agricultural universities in the wheat belt were expected to plant a wheat demonstration plot employing the new technology in their front yard. In January 1968 she released a commemorative postal stamp honouring the wheat revolution — well before there was any evidence of the forthcoming beautiful harvest — clearly indicating her faith in the new technology. By early March, it was evident that the 1968 wheat harvest was going to be enormous.

Impact of the Green Revolution

The term "Green Revolution" was coined in 1968 by Dr. William S. Gaud, Director of the US Agency for International Development (USAID), to describe the breakthrough in food production caused by the introduction and rapid diffusion of the new semidwarf wheat and rice varieties in India, Pakistan and other parts of the developing world.

The Green Revolution has had a far-reaching impact on the economic and social structures of many low-income, food-deficit nations. Many initial reporters chose to depict the Green Revolution as the wholesale transfer of technology from high yield agricultural systems to peasant farmers in the Third World. To me, however, it signified a new era in agricultural research and development in the Third World, one in which modern principles of genetics and plant breeding, agronomy, plant pathology, entomology and economics were applied to develop technologies appropriate to the conditions of local farmers. The impact on food production of the high-yielding wheat and rice technologies has been enormous (Table 1). In 1964-65, there were probably less than 5,000 hectares planted to the new high-yielding semidwarf wheat and rice varieties worldwide; by 1990, there were more than 130 million hectares growing these plant types.

The new wheat and rice varieties have been the catalyst for many other technological changes in agriculture in Asia. Fertilizer use has increased more than fifteen-told, the irrigated wheat and rice area has expanded by 50%, and the amount of irrigation water available for wheat and rice cultivation more than doubled. The high-yielding wheat and rice technologies also led to

Table 1. Estimated Changes in Wheat and Rice Production, Yield, Area, and Input Use in Developing Countries, 1965-94

	1965	*1975*	*1980*	*1985*	*1994*	*% Change 1965-94*
Population, millions	2,210	2,950	3,280	3,650	4,350	97
Wheat & rice production, million t	303	451	527	652	739	144
Yield, t/ha	1.5	1.8	2.3	2.8	3.2	113
Area, million ha	190	228	234	234	230	21
Fetilizer, million t	4	20	38	46	65	1,525

Source: FAO Production and Fertilizer Yearbooks positive spillover effects on other crops, as farmers sought to improve productivity in other farm enterprises.

One of the greatest contributions of the Green Revolution in India has been the land saved, which would have been needed to feed the population. Let's examine the figures briefly. Had the same wheat and rice yields prevailed today that prevailed in 1961-65, India would have needed an additional 94 million hectares of similar quantity to produce the 1995 wheat and rice harvests (Tables 2 and 3). Imagine the environmental consequences of trying to bring this additional land into cultivation! Indeed, it would have required the bringing into production lands not suited for intensive cultivation, including forest and grasslands, hillsides.

Contrary to the prediction of some critics — that the new high-yielding technologies were only suitable for richer farmers — it is now well-documented that India's resource-poor farmers, with only relatiely brief lag time, adopted the new seed/fertilizer technologies about as frequently as the more resource-privileged, large-scale farmers. Nor did the pediction that Green Revolution technologies would accelerate labour displacement in rural areas prove true. While some categories of labour declined, e.g., threshing, many new job opportunities opened up in farm machinery operations, input supply, grain marketing and other agro-services; the net effect on rural employment has been positive.

Table 2. Profile of Wheat Production in India and Land Saved Through Productivity Gains

Year	*Area* 1000 ha	*Yield* kg/ha	*Production* 1000 ha	*Land Saved* 1000 ha
1961-66	13,191	830	10,950	-
1970	16,626	1,209	20,093	7,582
1975	18,111	1,338	24,235	11,087
1980	21,962	1,437	31,560	16,061
1985	23,100	1,909	44,100	30,032
1990	23,500	2,120	49,850	36,560
1995	25,490	2,560	65,240	53,112

Source: FAO Production Yearbooks

Table 3. Profile Rice Production in India and Land Saved Through Productivity Gains

Year	*Area* 1000 ha	*Yield* kg/ha	*Production* 1000 ha	*Land Saved* 1000 ha
1966-70	36,360	981	35,770	-
1975	37,890	1,045	39,580	2,487
1980	38,970	1,082	42,180	4,027
1985	41,100	1,418	58,300	18,329
1990	42,170	1,756	74,053	33,827
1995	41,640	1,952	81,260	41,194

Source: FAO Production Yearbooks

The consumer, however, has been the main beneficiary of the Green Revolution. The really important attribute of the new technologies was that they simultaneously provided farmers with increased profits and consumers with more bountiful and reliable food supplies which, in turn, led to declining real food prices. It is calculated that in real terms the cost of wheat-rice has declined by over 70% in this time — a tremendous contribution to poor men, women and children. The large wheat and rice harvests have enhanced food security in many developing countries. In India, for example, wheat stocks reserves have been built up in good years to help compensate for the bad years when harvests are not as good. Greater food security has been especially important to the poor consumer, who in the past suffered chronic and serious malnutrition in years when poor harvests sent up food prices skyrocketing.

The Green Revolution also taught many political leaders in the Third World that a dynamic agricultural sector can neither be initiated nor sustained without the support of dynamic research and technology delivery systems. Over the past 25 years a large research infrastructue — scientists, experiment stations, laboratories, trained manpower — has been built up in the developing world, involving tens of thousands of researchers, mostly working in publicly funded institutions. Considerable growth in the international agricultural research network has also occurred since the establishment of IRRI in 1960 and CIMMYT in 1966. Today 16 centres and 1,200 scientists are supported by the Consultative Group for International Agricultural Research (CGIAR).

Current Status of World Food Supply

In 1990 our world food supply totalled about 4.6 billion tons gross weight (2.4 billion tons edible dry matter), which was more than twice the tonnage produced in 1961-65 (Table 4). Approximately 98% of this food supply came from the land; less than 2% came from the oceans and inland waters. Some 30 plant species provided most of the world's calories and protein. Eight species of cereal grains, collectively accounted for 70% of calories and 42% of the protein contained in the world food supply.

If the world's food supply were distributed evenly the total food supply could have provided an adequate diet (2,350 calories, principally from grain) for 6.5 billion people — 1 billion more than the current population. If, however, dietary standards in developing countries had been better, so that 15% of the calories came from animal products, less than 4 billion people could be fed. And if people in developing countries had attempted to obtain 30% of their calories from animal products, as in the USA or European Union countries, a world population of 2.7 billion people could be sustained — only half of those actually present on the planet Earth!

Feeding the Future : The Challenges Ahead

Future world food demand will be determined by two factors: population growth and per capita food consumption. The United Nations Population Agency's medium projection is for world population to reach 6 billion by the year 2000 and about 8 billion by 2025, before stabilizing at about 10 billion toward the end of the 21st century. Over 90% of the world's projected 3 billion additional people will reside in what are now low-income developing nations (Table 5).

Table 4. World Food Production, 1990

Commodity	*Million metric tons*			*Production Increase, % 1980-90*[2]
	Gross Tonnage	*Edible Dry Matter*[1]	*Protein*[1]	
Cereals	1,970	1,640	165	20
Wheat	600	528	62	29
Maize	480	422	44	13
Rice	520	353	30	31
Barley	180	158	16	10
Sorghum/millet	85	76	7	—4
Roots & Tubers	575	154	10	5
Potato	270	59	6	0
Sweet potato	125	37	2	—7
Cassava	150	55	1	22
Legumes, oilseeds, nuts	300	204	68	29
Sugarcane & sugarbeet[3]	125	125	0	20
Vegetables & melons	450	53	5	26
Fruits	345	47	2	17
Animal products	850	168	74	24
Milk, meat, eggs	750	141	56	18
Fish	100	26	18	33
All Food	4,615	2,390	397	20

[1] At zero moisture content, excluding inedible hulls and shells.

[2] 1979-81 and 1989-91 averages used to calculate changes.

[3] Sugar content only.

Source: 1990 FAO Production Yearbook

Table 5. World Population Projections

	Population (millions)			*% Increase*
Region	*1990*	*2000*	*2025*	*1990-2025*
Low-and Middle-Income Economies				
Sub-Saharan Africa	495	668	1,229	148
East Asia & Pacific	1,577	1,818	2,276	44
South Asia	1,148	1,377	1,896	65
Europe	200	217	252	26
Middle East & N. Africa	256	341	615	140
Latin America & Caribbean	433	515	699	61
Sub-total	4,146	4,981	7,032	70
Other Economies[1]	321	345	355	11
High-Income Economies	816	859	915	12
World	5,284	6,185	8,303	57

[1] This classification includes the former Soviet Union, Cuba, the Democratic people's Republic of Korea, for which inadequate and/or unreliable data is available.

Source: World Development Report 1992, World Bank

Even if the often inadequate per capita nutritional levels of 1900 were maintained, annual world food production in 2025 must be 60% greater (7.4 billion tons gross weight) than it was in 1990 (4.6 billion tons gross weight). However, if there are dietary improvements among the poor in low-income, food-deficit countries' annual world food demand by 2025 could be as great as 8.2 billion tons gross weight, twice as much as the 1990 production level.

South Asia and Sub-Saharan Africa are the regions with the most poverty (Table 6). By the year 2000, South Asia will still have the largest absolute numbers of poor people although sub-Saharan Africa still will have the highest percentage — 50% of the total population — in such dire straits. Hopefully, some of the students in this room will make contributions to the reduction of poverty through their research and work as agricultural professionals.

Using the population growth rates shown above, and expected changes in per capita cereal demand, I have come up with following projections for the cereal crops through the year 2025 (Table 7). To meet the projected food demands, the average yield of all cereals must be increased by 80% between 1990 and the year 2025. Fortunately, there are still many improved agricultural technologies — already available or well-advanced in the research pipeline, and only partially being exploited — that can be employed in future years to raise crop yields. There are still large unexploited "yield gaps" in virtually all low-income, food-deficit developing countries as well as in the former Soviet Union and Eastern Europe.

Yields can still be increased by 50-100% in many areas of Asia, Latin America, the former USSR, and Eastern Europe, and by 100-200 per cent in much of sub-Saharan Africa. Such productivity grains can be achieved by improving efficiency all along the crop production line, beginning with better land preparation to assure optimum crop stands, more timely planting of the very best available varieties, proper fertilization, and improved control over menacing weeds, diseases and insects. Of course, as yields become higher, assuring proper nutrient balances and conserving soil moisture under rainfed agriculture, or if under irrigation, better water management, will become ever-more important.

More recent estimates by IFPRI indicate that extra demand for wheat and maize will far outstrip that for rice.

The declining per capita availability of arable cropland in many of these countries means that future production gains must

Table 6. Poverty[1/] in the Developing World, 1985-2000

	Percentage of population below the poverty line			*Number of poor (millions)*		
Region	*1985*	*1990*	*2000*	*1985*	*1990*	*2000*
South Asia	52	49	37	532	562	511
East Asia	13	11	4	182	169	73
Sub-Saharan Africa	48	48	50	184	216	304
Mideast & N. Africa	31	33	31	60	73	89
Eastern Europe[2/]	7	7	6	5	5	4
Lat. Amer. & Carib.	22	26	25	87	108	126
All Developing	31	30	24	1,051	1,113	1,107

1/ US$ 370 annual income per capita in 1985 purchasing power parity is used as the poverty line, it is based on estimates from a number of sources. In 1990, the poverty line would be approximately US$ 420 annual income per capita.

2/ Does not include the former USSR.

Source: World Development Report 1992 (Table 1.1, p. 30)

Table 7. Current and Projected World Cereal Production and Demand (million tons) and Yield Requirements (kg/ha)

Production	*Current*	*Projected Demand*		*Yields, t/ha Actual*	*Required*	
	1990	*2000*	*2025*	*1990*	*2000*	*2025*
Wheat	600	740	1,200	2.4	2.8	4.4
Rice	520	640	1,030	2.4	3.1	5.3
Maize	480	620	1,070	3.7	4.1	5.8
Barley	180	220	350	2.3	2.7	4.1
Sorghum/millet	85	110	180	1.5	1.8	2.6
All cereals	1,970	2,450	3,970	2.5	2.9	4.5

Source: FAO Production Yearbook and my estimates come, even more than in the recent past, from higher crop yields and more intensive land use practices. Furthermore, because 10 to 12 years usually elapse between the time research is funded to the point when the results show up in food production figures, the productivity gains for the remainder of the 20th century must come from research investments already made. Fortunately, there are many improved technologies already available or well-advanced in the research pipeline that can raise crop yields by 50-100% in most tropical and subtropical farming areas of Asia and Latin America, and by 100-200% in much of sub-Saharan Africa. To capitalize on this unexploited agricultural potential, however, far greater investments will be needed now and in future years in agricultural research, water resource development, input production and distribution systems, rural education, and public health.

The Importance of Agricultural Research

Continuing research and new technology generation are the key to meeting the world food demands of the 21st century. Although the capacity to produce and distribute new agricultural technology in Third World has increased immensely over the past 30 years, the rate of agricultural modernization during the 1980s has slowed. One of the problems, I believe, lies within the organization and management of agricultural research system itself—both at the national and international levels. I am especially concerned about the very poor links between research, *per se*, and technology generation and delivery.

In looking back over my 52-year career in international agricultural research and development, I have found it often easier to develop an improved technology than to get it into the hands of farmers. In trying to transform a stagnant traditional low-yielding agriculture, we must be aware of the inertia and defeatism that exists at many levels in government organizations. The peasant farmer is often blamed for being unwilling to adopt new technologies; I strongly disagree with this thesis, having found the peasant farmer to be very receptive to adopting new technology if it offers a large increase in productivity within reasonable levels of risk.

Often the major stumbling block has been government civil servants, including many agricultural research leaders, who try to protect themselves by clinging to the *status quo* and thereby often repress creative new research initiatives. For this group, *status quo* of the known traditional methods is comfortable whereas the fear of the new unknown technology is frightening. These are the negative forces against which agricultural researchers and extension workers must struggle if they are to succeed in serving their farming communities. Without venturesome scientists capable of cutting across disciplines and integrating research information into viable technologies, and who have the courage and ability to make their case with political leaders to bring research advances to fruition, the future diffusion of new agricultural innovations in the low-income, food-deficit nations is not at all assured.

From my perspective, agricultural research managers and decision makers need to spend more time on the ground, monitoring what is happening — or not happening. Further, some IARC researchers must limit their pursuit of beautiful academic butterflies and must strengthen their interactions with national research and extension systems, and farmers. Too many have become detached from the realities in farmers' fields, preferring to measure their achievements by the information and products generated — and learned papers published — rather than by adoption of their technologies in the countryside. This should be changed.

Plant breeding is the greatest practical achievement of the biological sciences in the 20th century. Compared to the traditional varieties, today's new cereal crop varieties are vastly more efficient in grain production and in their genetic resistance to diseases and insects and tolerance of various agroclimatic stresses. The greatest successes in diffusing improved cereal varieties have been in wheat and rice, where about 70% of the area in the developing world is planted to high-yielding varieties. Growing success is also being achieved in diffusing the improved varieties of maize, barley, sorghum, the pulses, and oilseeds developed by agricultural researchers.-

Permit me to comment on obsolescent plant and animal quarantine regulations. Thirty years ago, the human disease quarantines were complicated and bureaucratic. To travel internationally one had to have a large number of vaccination certificates, for a large number of diseases. Some of these vaccinations, such as for cholera and typhoid, were very ineffective and not recognized as being useful by many MDs. Nevertheless, a large, flourishing, sterile, difficult bureaucracy was spawned. Over many years of struggle this has been changed, and the result is that today, to travel internationally, one needs only a vaccination certificate for yellow fever, in most countries.

Even though two hundred million tons of grain per year and large tonnages of many other agricultural commodities are traded internationally, there is no fumigation or disinfection required, because of the way the standards are written. Yet there are many impurities that move with this grain, including weed seed, loose bits of straw, dirt, insects, and fungal spores of many different kinds. On the other hand, if one attempts under current regulations to ship 5 to 10 gram samples of grain of improved crop varieties to collaborators in other countries, one is confronted with a whole complex of plant quarantine regulations and an extremely inflexible and arrogant bureaucracy.

At the present time, some scientists in the world are outspokenly attacking others for lack of genetic variation in the improved crop varieties they are developing. I do not accept this accusation. It is my belief, certainly in wheat but I am sure it is true in rice, maize and most of other basic crops, that there is more genetic variation in the total cropping system today than has ever existed in the past. This tremendous genetic variation has been incorporated by conventional plant breeding and in more recent years further improved by the use of biotechnology transformations and the incorporation of DNA from other species and genera. Of course, it is true that not all of that genetic variation is being planted and that some very popular and successful varieties or hybrids are grown on vast areas. However, if plant pathologists and entomologists are properly monitoring commercial crops to report changes in new races, if active plant breeding programs are under way to pyramid genes for resistance, and if seed delivery systems are in place to move the seed of new varieties to farmers' fields, then our agricultural areas can be protected from any serious damage. This is more true today than ever before.

One of the great obstacles to further assist in the diversification of genetic material is the above mentioned difficulties with the plant quarantine system. They are obsolete, they need to be brought up to date and made realistic as has been done in the human medical field. Why don't agricultural scientists speak out against the ludicrous system of plant quarantine for experimental germplasm? Surely no one would deny that the two hundred million tons of grain that are traded internationally pose far greater dangers than the shipment of small quantities of seed that have been inspected carefully, disinfected and/or fumigated with the best processes now available. Again, *status quo* is comfortable. Unfortunately, the many scientists who have become infected with this timidity virus and are reluctant to speak out against obsolete rules and regulations are increasing the dangers for failure of our crop production system.

Getting Agriculture Moving

To achieve the agricultural productivity gains needed in low-income, food deficit countries to keep pace with rising consumer demand, a combination of factors constraining yield must be manipulated and overcome in an efficient and orchestrated manner. These include: 1) restoration and management of soil fertility, 2) development and use of improved crop varieties (and animal breeds) combining higher genetic yield potential with improved disease and insect resistance, and 3) improved crop management practices including integrated pest management and soil fertility and moisture management programs.

Given current scientific knowledge, it is my belief that agricultural chemicals — especially fertilizers — are absolutely essential to produce the food needed to feed today's population of 5.7 billion, which is increasing currently at the rate of nearly 100 million per year. The amount of organic fertilizers available and crop rotations employing legumes cannot alone — without the use of chemical fertilizers — restore and maintain soil fertility to a level adequate to meet the current and rapidly growing food production requirements. The population monster does not allow us to turn back the clock to the "good old days" of the early 1930s, when few agricultural chemicals and little chemical fertilizer were used. Lest I be misunderstood, I want to stress that agricultural chemicals and fertilizers, like medicine, should be used with the proper caution. Clearly, the maintenance of soil fertility becomes more complicated as crop production is intensified. In the future, farmers will have to become more skilled in soil chemistry and agronomy if they are to deal with the growing secondary and micro-nutrient deficiencies which must be corrected to sustain high grain yields.

The technology that has greatly changed the world food production over the last 50 years, and enabled food production to stay abreast and increase slightly faster than world population, involves the use of improved high yielding crop varieties and proper seed rates and dates of planting, land leveling, fertilization to restore depleted nutrients, and control of disease and insects and weeds. The so-called broadly-adapted, high yielding varieties of wheat and rice that were introduced into Asia during the 1960s, and which produced dramatic results, were not an elixir in themselves. They do not have ability to produce high yields on worn out soils without restoration of the nutrient balance by the proper use of fertilizer to meet the nutrition needs of the plant.

Yet, despite the enormous benefits that chemical fertilizers have brought to the world — which greatly outweigh any deleterious effects due to overuse — the issue of chemical fertilizer use is still subject to heated, and generally uninformed, debate. The fertilizer use issue was a problem in the 1940s and 1950s in Latin America, especially in Mexico. It was one of the main issues that was passionately debated in India, Pakistan and China during the 1960s and early 1970s and currently, it is one of the issues that is most hotly debated in African countries south of the Sahara. In reality the major culprits in overuse of fertilizer are the profligate agricultural systems used in many countries of the north.

Over the past two decades, the environmental movement which has grown in popularity and power, has done much to further confuse the issues concerning restoration of soil fertility. For example, the "virgin" uncultivated oxisoils of Brazil, Colombia, Venezuela, Peru and parts of Africa, because of heavy leaching over geologic periods of time, these soils are depleted of several essential nutrients for vegetative growth. Thus, Mother Nature is involved as well. Moreover, because of the leaching of calcium and magnesium they are strongly acidic and high in soluble aluminium, which is toxic to the roots of most plant varieties. This is the work of Mother Nature not agricultural man. Humankind certainly is also guilty of depleting plant nutrients. This is why slash and burn shifting cultivation has been so pervasive until relatively recent times. By opening new land, there was an abundance of nutrients for a few years. But as the nutrients were depleted, and plant competition was increased by aggressive weeds, crop yields dropped precipitously, to a point where it was easier and more economical to open new land and abandon the previous land to fallow for 10-15 years. Only during the past one hundred years, has shifting cultivation given way to continuous cultivation based on the replenishment of soil nutrients increasingly with chemical fertilizers.

I should also point out that the forests of Europe were largely destroyed to provide for the agriculture which fed those nations as they were being urbanized and industrialized. The same is true of the United States. The Ohio river valley, for example, which is today one of the most important parts of the US grain belt, was once covered with forests, but was deforested and converted into some of the best agricultural land in the world. Consequently, when we see what is going on in the rain forest and some of the other forests in areas of Latin America and Africa today, Europeans and Americans should not forget their own histories. While I do not condone what is going on there, we need to remember that the problem of soil infertility has been haunting humankind from the begnning of agriculture. As human numbers accelerate, the significance of maintaining soil fertility becomes increasingly crucial, not only for food security but indeed to preserve civilization.

Let me use an outstanding example, the case of one of the first American civilizations, namely, the civilization of Teotihuacan which was established apparently about 300 BC and flourished and began to deteriorate in the early part of the eighth century AD, and had collapsed by the end of that century. The civilization of Teotihuacan was built on agriculture. At its peak, the city was estimated to have had a population somewhere between 150,000 and 200,000 people. It was even larger than Caesar's Rome. Why did it collapse? There are many different theories. Some scientists believe that the springs and water table dropped below the levels necessary to support the potable water needs of the city; other blames cataclysmic earthquakes; others blame epidemics of pandemic disease; others the shortage of wood for housing, roofing and for cooking and heating fuel, and others attribute the collapse to conquest by a stronger tribe.

However, it is my contention that Toetihuacan collapsed because of the depletion of plant nutrients. We must remember that this huge city was built without either the benefits of the wheel or an animal beast of burden. If one assumes a population of 150,000 with a diet of 2,350 calóries per day, largely from maize and beans, one begins to see the problem of supplying that city with its daily food needs. The requirements for maize alone would have been about 88 tons per day. Expressed in terms of 40 kg sacks that would have to be carried on human backs, some 2,200 sacks per day would be required, or approximately 800,000 sacks per year. At that time, there was no information available to the population about how to restore the fertility to the land and the result the collapse of Teotihuacan. As the soil fertility was depleted, more and more of the food had to be brought from greater distances until finally the system collapsed.

Currently, extremists in the environmentalist movement, who have strong influence over international financial institutions by way of lobbying, have convinced the authorities that there is no need for chemical fertilizer, and that organic fertilizers can meet crops needs for a stable food supply. How far this is from the truth. We cannot produce the food that the world needs with the use of organic fertilizers alone, especially for African countries south of the Sahara where there is very little organic matter available. To preach this recommendation is to condemn these African countries. It is time that the world wakes up to this threat!

A major factor responsible for the high payoffs from past agricultural research investments in the developed market economies has been the success of their technology delivery systems, in which private sector organizations have played a major role in supplying information, inputs and agricultural services to the farmer. In many developing nations, the situation is exactly the opposite. Private sector organizations still play a minimal role in the delivery of improved technology while publicly funded input supply, credit and marketing organizations have not been successful in serving the farmer, especially the small-scale producer. Government planners and policy makers must come to grips with the problems of poorly functioning technology delivery systems; what is the value of research that is not used?

In 1986, I helped initiate several agricultural development projects in a handful of sub-Saharan African countries, in collaboration with the late Japanese philanthropist, Ryochi Sasakawa (and now enthusiastically supported by his son, Yohei), and former US President Jimmy Carter. These agricultural assistance programs, called Sasakawa-Global 2000 projects, have met with tremendous success in demonstrating basic improvements in maize, sorghum, and/or wheat production. Most of the components of these technologies had been available for a decade, but were laying around, largely unused, on agricultural experiment stations.

Over the past 10 years, we have worked with some 5,000 extension agents in Ghana, Tanzania, Benin, Togo, northern Nigeria, Ethiopia, and Mozambique and more than 250,000 small-scale farmers. We provide each farmer with the technical backstopping and the needed inputs (on credit) to grow a test plot (0.25 to 0.5 ha in size) employing a simple package of improved technology : the best high-yielding variety available, moderate applications of fertilizer, and improved cultural practices. With yields two to three times greater than those previously obtained with traditional technology, the receptivity and enthusiasm of these small-scale farmers is every bit as great as it was in India and Pakistan, when the Green Revolution was taking off 30 years ago. We are now working closely with national policy makers and international development agencies officials to develop policies to strengthen technology delivery systems to sustain these productivity gains.

Closing Comments

Twenty-five years ago, in my acceptance speech for the 1970 Nobel Peace Prize, I said that the Green Revolution had won a temporary success in man's war against hunger, which if fully implemented, could provide sufficient food for humankind through the end of the 20th century. But I warned that unless the frightening power of human reproduction was curbed, the success of the Green Revolution could only be ephemeral. I believe that agricultural scientists have a moral obligation to warn the political, educational, and religious leaders of the world about the magnitude and seriousness of the arable land, food and population problems that lie ahead. If we fail to do so in a forthright manner, we will be negligent in our duty and inadvertently will be contributing to the pending chaos of incalculable millions of deaths by starvation. The problem will not vanish automatically; to continue to ignore it will make a future solution ultimately more difficult to achieve.

JNU in Global Education Network

The Jawaharlal Nehru University (JNU) has decided to participate in Unesco effort to launch a functional network of universities committed to globally oriented multi-disciplinary education. The main objective of this network is to develop an innovative approach to prepare students for careers and lifestyles in a global society of the 21st Century.

Under this arrangement, the universities will be linked via the internet to get all students involved in a scenario development exercise to create a desirable, sustainable global future for a multicultural perspective.

JNU is already a part of the Global University Network in which ten universities of the world are participating.

Accepting the offer to join the Unesco effort, JNU Vice-Chancellor, Prof. Yoginder K. Alagh has written to the Director General of Unesco, Dr. Federico Mayor, that the Unesco initiative would further enrich JNU's global perspective. This initiative is being technically backstopped by Case Western Reserve University and apart from JNU, Polytechnic University of Catalunya (Spain), Trier University (Germany), Bilkent University (Turkey) are the other participants. Prof. Mihajlo D. Mesarovic, Cady Staley Professor, Systems Engineering and Mathematics, Case Western Reserve University is technically supporting the efforts.

The first meeting of the representatives from JNU and other participating institutions of the proposed network is scheduled for June 24-28, 1996 in order to develop network as also to provide information and training in the use of the teaching support tool, GLOBESIGHT which is proposed to be used in the Global Issues Courses. Based on this material, a core course is likely to be devised for use in all the participating institutions. It is believed that it will enable a dialogue on global issues amongst students and instructions.

Orientation Course for Varsity & College Teachers

The Academic Staff College, University of Gorakhpur, organised a four week four module orientation course for freshly appointed teachers of University and colleges. Prof. P.S. Pandey, Director of the college, in his welcome address, traced the origin and growth of academic staff colleges (ASCs) in the country. He said that ASCs were established to fulfil certain well-defined objectives in pursuance of the New Education Policy. While it was considered necessary to make education an instrument of social change, special stress had to be laid on quality of education and cultivation of excellence. The object of education, in general, and of higher education, in particular was pursuit of excellence, he said and added that basic faith in acquisition of excellence required ceaseless effort, for there could be no limit to excellence. The New Education Policy placed the teacher at the centre of the scheme of education and stressed the value and significance of his academic equipment, on the one hand, and his social awareness, on the other.

Inaugurating the course Prof. Ram Chandra Tewari, Retired Professor and Head of Dept of Hindi, Gorakhpur University, deplored deterioration of standards in education and erosion of values in every walk of life. He said that a teacher should equip himself intellectually and should take special care to strengthen the moral foundation of his personality. Teaching should be taken more as a mission than a profession. He exhorted the participants to perform their teaching duties with utmost sincerity and devotion thereby fulfilling their obligations towards society.

The course ran in two sessions and a four-fold pattern of division into components A, B, C and D was followed. Component A comprised lectures delivered by learned resource persons on topics of general interest with an inter-disciplinary bias. Some of the topics chosen under this component were : Need for an egalitarian society in India, Problems of pluralist society, Challenges to the policy of secularism, Composite nature of Indian culture, Need for value-based education, Sociology of literature, Basic philosophy of directive principles of state policy as enshrined in the Constitution of India, and Poverty alleviation programmes in India. The object of these lectures was to create in the participants an awareness of social problems and national issues and extend their mental horizons beyond the limit of their own respective disciplines.

Lectures under component B of the course delivered in the second session were intended to acquaint the participants with the latest researches in methods and techniques of education.

Component C related to subject upgradation. In the spheres of their respective subjects where participants found themselves deficient and where they wished to have themselves academically reinforced, academic assistance was provided. Arrangements for such academic upgradation were made in subjects such as Hindi, Sanskrit, Music, Political Science, Economics, History, Sociology, Chemistry, Law and Anthropology.

Component D of the course laid sole emphasis on personality development of participants. Each participant was required to present an article in a seminar organised for the purpose and the article, after it had been read out by the author, was thrown open for discussion among the participants.

The course was attended by 16 teachers professing various disciplines and drawn from different states, such as Bihar, Madhya Pradesh, Uttar Pradesh and the Union Territory of Andaman Nicobar.

IIML/NISSAT Management Development Programme

The Indian Institute of Management, Lucknow (IIML) recently conducted a training programme on "Information Technology (IT) Application in Library & Information Services (LIS). 25 senior level Librarians and Information Managers from all over the country attended the programme, which was inaugurated by Dr. J.L. Batra, Director of the Institute.

The programme was designed to equip the participants with adequate knowhow on : developments in IT : current trends and future prospects; IT application in LIS; legal aspects and strategies for adopting IT in LIS; and impact of IT on human resource.

The training package developed by Dr. Roshan Raina, Programme Director had been designed around the following themes : IT: State-of-art in the Context of LIS (Computers, Communication and Database Aspects; Secondary Storage; Barcoding, Reprographics, Micrographics, AV Equipment, etc.); Multimedia & Hypermedia; Information Networking; User behaviour, legal policy considerations and management issues; and Human Resource & IT.

The topics discussed at the technical sessions include: (i) Overview of IT; (ii) A Case Study of IT Application in IIML library; (iii) Information Networking; (iv) IT and User Perspective; (v) IT and Human Resource; and (vi) Legal, Policy and Management Issues.

Computer sessions, hands-on sessions with other IT products, demonstrations of IT products, and sessions on experience sharing were the other enriching components of the programme.

The programme was financially supported by NISSAT (DSIR).

TQM in Library Services

A seminar on "Total Quality Management" for library and information services was inaugurated by Shri Ashok Garde, Director, ATIRA at the Gujarat Vidyapith. Shri Vinodbhai Tripathi, Registrar, Gujarat Vidyapith, presided while Prof. Dhaval Mehta, Director, Department of Business Management, Gujarat University, was the chief guest.

Shri Kanubhai Shah, Librarian & Head, Department of Library & Information Science and Co-ordinator of the seminar, in his opening remarks, emphasized optimum utilisation of the available resources of the library to provide quality services. Shri Garde explained the importance of TQM in an institution. He also discussed in detail and with examples the basic ideas about TQM. Shri Dhaval Mehta, emphasized the overall quality of work in an institution whereas Shri Vinodbhai Tripathi advised on the quality achievement of an individual so that the satisfaction to the user could be attained.

During the first session, Prof. Dhaval Mehta talked about the basic theory of continuous improvement in an organisation for achieving the total quality for which there should always be cooperation between management and employees which could lead to the satisfaction of the user. "The brain storming process" to get the new ideas on a particular topic was also demonstrated by Prof. Mehta.

Various papers on the theoretical and practical aspects of TQM, in the context of library services were presented by the delegates. Shrimati Shushma Porwal, Deputy Librarian of SNDT University, Bombay, demonstrated by conducting brain storming meeting, various new ideas, that could be evolved in the field of computer application in library services. Shri Karnik of British Council Library explained the standards to be adopted in TQM for library services. Shri Kalpesh Parikh of *The Times of India* discussed in detail the need of infrastructure for making the library as a learning resource centre. He also explained the use of new technological equipment in the library computer like Pager, Cellular-Phone, DTP, CD-Rom, etc. in order to give qualitative service in a University Library.

Knowledge for the New World Order

Padma Bhusan Dr. P.N. Bhargava, Founder Director, Centre for Cellular and Molecular Biology (CCMB) delivered a guest lecture on Knowledge for the New World Order at the Dr. B.R. Ambedkar Open University, in Hyderabad recently. He pointed out that all forms of nature resembled each other, for example, the structure of bee-hive, the rose petal, the DNA structure all displayed beautiful structural harmony.

Dr. Bhargava said that the musical notes and DNA structure resembled a great deal. In the 21st century, human beings were going to face a lot of polito-ethical questions such as determining the sex of the baby even before conception, the distribution of human organs such as kidney to the needy patients and the case of mercy killings. Though science had brought immense benefit to humankind it had also created many sources of conflict. The people and the government had to make judicious and conscious decisions in this regard, he said.

He further observed that the days of 'ignorance is bliss' had gone and today knowledge was powerful, the country which held knowledge globally would be a global power, the state which controlled knowledge state-wide would be a state power. He suggested that Dr. B.R. Ambedkar Open University should offer courses on various aspects of science and technology for the benefit of common man. These courses should be directed at people who did not seek certification but wanted to acquire knowledge in various domains in Science and Technology.

The University Vice-Chancellor I/c, Sri S. Anwar, who presided over the function, said that the University would organise a series of guest lectures on topics of general interest.

IGNOU Signs MoU with IREDA

The Indira Gandhi National Open University (IGNOU) and the Indian Renewable Energy Development Agency Ltd (IREDA) are reported to have signed a memorandum of understanding (MoU) to cooperate and collaborate regarding information dissemination and human resources development in the areas of renewable energy in the country. The MoU was signed by Dr V Bakthavatsalam, Managing Director, IREDA, and Prof Janardan Jha, Pro-Vice Chancellor, IGNOU in New Delhi recently. According to Prof Kapil Kumar, Director, Centre for Extension Education, IGNOU, a task force representing members of IGNOU and IREDA has been constituted for implementation of areas of cooperation and IGNOU will carry out an assignment for assessing the training needs in the renewable energy sector, the priority areas being solar energy and grid-connected power. The areas of cooperation will include development of multi-media self-learning packages and teleconferencing.

Monitoring Ganga Action Plan

A high-level national monitoring committee of the Ganga Action Plan headed by Dr. S.Z. Qasim, Member, Planning Commission, visited the Environmental Biology Laboratory of Patna University and held detailed discussions with the local project coordinators and university authorities on quality control aspects and Dolphin conservation.

The committee members including the Project Director of National River Conservation Directorate, Mr. Vishwanath Anand, expressed their satisfaction with the progress made in the relevant field studies and also appreciated the upkeep of the laboratory. The Vice Chancellor of Patna University, Dr. S.N.P. Sinha, the pro-vice-chancellor, Dr. S.N. Ahsan and the principal investigator, Dr. R.K. Sinha, participated in the discussion.

Library Services in India & USA

A lively discussion on the availability of library services in India as compared to those of USA was recently held at the Patna University Institute of Library and Information Science. While a visiting professor of library administration, University of Illinois, Mr. N.K. Agrawal, detailed the automation of library and information services in USA, the Director of the PU Institute, Dr. U.M. Thakur, outlined the gradual expansion and development of library services in India. Dr. Thakur also elaborated on the recent modernisation of PU library following its linking with the UGC's INFLIBNET programme.

Czech Academy-CSIR Sign MoU

The Academy of Sciences of the Czech Republic is reported to have signed an agreement with the Indian Council of Scientific and Industrial Research (CSIR) to carry out joint research in a wide range of disciplines.

The agreement, which was the outcome of detailed discussions between the two sides taking into consideration the priorities for future development in both the countries, was signed by Dr. R.K. Bhandari, Head, International S&T Affairs Director, CSIR, and Prof. Jiri Niederle, President of the Czech Academy's Council of Central International Affairs in New Delhi recently.

The cooperative work would be in areas such as modification of natural polymers, wind effects on structure, heterogenous catalysts, monoclonal anti-bodies, rock mechanics and numerical modelling, non-equilibrium solidification and non-linear mathematical modelling and artificial neural networks.

Refresher Course in Maths

The Bangalore University proposes to conduct a national level refresher course in Mathematics from May 20 to June 14. Sponsored by UGC, the course is meant for Mathematics teachers teaching at undergraduate colleges having an experience of more than 5 years but less than 25 years. Preference will be given to teachers who have not participated in any refresher course earlier.

Further details may be obtained from Dr. M. Venkatachalappa, Co-ordinator, Department of Mathematics, Central College Campus, Bangalore-560 001.

AICTE Awards for Best Technical Books

The All India Council for Technical Education (AICTE) proposes to award prizes for best technical books written during last five years for course curricula in Hindi and other regional languages covering subjects of Engineering, Technology, Architecture, Town-planning, Management, Pharmacy, Applied Arts and Crafts. The main objective of the scheme is to promote technical writing in Hindi and other Indian languages and enthuse the authors to write latest technical books in Indian languages. This was revealed by Prof. S. K. Khanna, Chairman, at a meeting with the members of the Hindi Advisory Committee of the AICTE consisting of eminent academicians viz Dr. Nagendra, Dr. Inder Nath Choudhary, Prof. Suraj Bhan Singh, Dr. Sudhakar Pandey, Prof. Bandiwadekar, Prof. Nirmal, Prof. K.M. Lodha.

Patna and Ukranian Varsities Tie Up

An agreement fostering scientific and technological cooperation, establishment of joint technological ventures and exchange of study materials among the scholars of Patna University and those of Kharkov State Polytechnic University, Ukrain, was recently signed by their respective Vice-Chancellors, Dr. S.N.P. Sinha and Prof. Valeri Kravetes. The said agreement made during the recent visit of the Ukrain Vice-Chancellor to the state of Bihar aims at improving the relationship between the people of both the countries and promoting educational opportunities in both the countries.

5-Year Integrated Law Course

Guru Jambheshwar University is reported to have set up a separate faculty of law to start an integrated five-year course from the coming academic session. The new course has been modelled on the course at the National Law School, Gwalior.

Lecture Series on Electronics

A lecture-series titled "Frontiers in Electronics" was recently inaugurated at the Department of Electronics Science, Gauhati University. Dr. Amarjyoti Choudhury, Head of Electronics Science Department, in his welcome address, highlighted the aim and objectives of the lecture-series.

Dr. Devdas Kakati, Professor, IIT, Guwahati lauded the effort of the department in organizing the lecture-series that promised to bring the recent advances of electronics into focus. The first lecture in the series on "Monte-Carlo simulations: principles and applications" was delivered by Professor K. Mackeown of the University of Hongkong.

News from Agricultural Universities

Russian Ambassador Visits Parmar University

Mr Anatoli Drukov, Ambassador of Russia, recently visited Dr YS Parmar University of Horticulture and Forestry, Solan. He was accompanied by Mr T N Kaul, former Ambassador.

Prof L R Verma, Vice Chancellor of the University, in his welcome address, said that in Himachal Pradesh 40 per cent area was under dry and cold desert conditions which was very much suitable for growing multipurpose plant seabuckthorn. He said that the University had already started a seabuckthorn research-cum-demonstration centre in Tabo for the rehabilitation of cold desert areas of the state. He informed that beside China, Russia had done good research work on scientific and commercial exploitation of seabuckthorn and was producing 32 products out of it. The Vice Chancellor felt that the cooperation of Russian scientists in this regard could prove a boon for the economy of cold and dry zone of the state.

Mr Anatoli Drukov supported the ideas of the Vice-Chancellor and said that the exchange of scientific research and information particularly on seabuckthorn and other crops will be beneficial for the people of the both countries. He assured that the Russian scientists will visit the University to have more linkages between both the countries. Mr Drukov said that he was very much impressed by the activities of the University.

The Ambassador also planted a sapling of rubber plant and visited Library, Computer and Instrumentation Centre of the University.

News from UGC

Countrywide Classroom Programme

Between 16th May to 23rd May, 1996 the following schedule of telecast on higher education through INSAT-ID under the auspices of the University Grants Commission will be observed. The programme is presented in two sets of one hour duration each every day from 6.00 a.m. to 7.00 a.m. and 1.00 p.m. to 2.00 p.m. The programme is available on the TV Network throughout the country.

Ist Transmission
6.00 a.m. to 7.00 a.m

16.5.96

"Chromatography Techniques"

"Earthquake - Part II: An Indian Perspective"

"Between the Author and the Reader — The Publishing House"

18.5.96

"New Horizons"

"Highlights of Half Century: United Nations and Development - I"

19.5.96

"Facing the Future - Part I"

"The National Cadet Corps - Part I"

"The Week Ahead"

21.5.96

"Study of Potential Energy Diagrams - Part IV"

"Indian Historiography - Part I"

"Thalassaemia"

23.5.96

"Turmeric — A Spice that Heals"

"Communicators of Army: Excellence Through Training"

"Blooming Bud: Priyanka Sacheti"

IInd Transmission
1.00 p.m. to 2.00 p.m

16.5.96

"Career Counselling : Computer Science - Part I"

"Mharo Rajasthan"

"Literature and Society - Part V : A Conversation"

17.5.96

"Surreal Numbers"

"Protect your Creator: Dowry"

"The Chinar"

18.5.96

"Creating Advertisement - Part I: Designing Ads."

"Saharanpur Wood Carvings - A Flourishing Industry - Part I"

"Puppetry - Part I: For Play"

19.5.96

No Telecast

20.5.96

"The Week Ahead"

"Question Time - 26"

"Human Resource Development - Part 8: Demotion and Dismissal/Termination"

21.5.96

"Catalysis - Challenge for the 21st Century"

"Dance Depicts Life"

"Maxillofacial and Oral Surgery - Part II"

22.5.96

"Bio-Medical Engineering"

"The Miraculous Cosmos of the Brain: Don't Trust Your Eyes"

23.5.96

"Career Counselling : Computer Science - Part II"

"Aravalli Supergroup - The Proterozoic Rock"

"Learning about Foreign Languages"

Hindi Telecast

प्रातः 6.00 से 6.30 बजे तक

17.5.96

"महाराजा उम्मेद सिंह : आधुनिक मारवाड़ के निर्माता"

20.5.96

"वास्तुप्रकाश"

"योग द्वारा स्वास्थ्य लाभ - भाग - IV"

22.5.96

"जलजीव संवर्धन"

"प्रकृति पुत्र आदिवासी"

News from Abroad

Educational Technology 2000

The Commonwealth of Learning (COL), in collaboration with the Asian Mass Communications Research and Information Centre, proposes to organise a conference on Educational Technology 2000 at Singapore on August 15-17, 1996.

This conference will provide a convenient platform for countries, large and small, unilingual and multilingual, to get together to forge action plans for cooperation and collaboration between educational, media and technology organisations.

The main objectives of ET2000 are to provide: (1) A forum for dialogue between the educational community and the educational media/technology industry; (2) An opportunity for the educational community to articulate their needs to the industry in an effort to seek appropriate media/technology solutions; (3) An opportunity for industry to demonstrate the capabilities of a full-range of existing and emerging educational media & technology; and (4) Demonstrations of practical applications and case studies from all educational sectors.

The focus of the conference will be on multimedia, mixed media, satellite broadcasting, teleconferencing—video/audio, computer mediated communication. So far the Education Sectors are concerned, the focus will be on higher education, non-formal education, business and industry, technical/vocational education, primary & secondary education, and continuing professional education.

The Technology Showcase being arranged on the occasion will present the latest and most innovative technologies in open and distance learning. It will feature exhibits from the communications and information technology industry specialising in educational technologies as well as software and-courseware developers. On-site demonstrations will provide conference participants with an opportunity to evaluate technologies and media for practical applications in education.

Further details may be had from Dr. Abdul Khan, A/Head, Communications and Information Technologies, The Commonwealth of Learning, #1700 - 777 Dunsmuir Street, Box 10428, Vancouver B.C., Canada V7Y 1K4

German Research Fellowships

The German Academic Exchange Service (DAAD) has offered 29 fully-funded fellowships for qualified Indian nationals, for research between one and two years at premier German universities and laboratories.

The offer is extended to the Ministry of External Affairs, and applications for fellowships are handled by DAAD's three Indian partners: the Department of Education of the Ministry of Human Resource Development (HRD), the University Grants Commission (UGC) and the Council of Scientific & Industrial Research (CSIR).

For the past 35 years, DAAD's Branch Office for South Asia in New Delhi has been offering these and a number of other fellowships including those funded through the prestigious Alexander von Humboldt Foundation (AvH) and Max Planck Society (MPG) — to highly qualified young Indian scholars.

BOOK REVIEW

A Trend-Setter

G. B. K. Hooja*

Sarla Grover. Researches in Human Development. Jaipur, Printwell, 1996. Pp. 300. Rs. 495.

In bringing out this book, Sarla Grover has done a signal service to the English-educated community. As will be seen later, I am deliberately using the word "English-educated". It is a pioneering effort and should serve as a trend-setter in the academic scenario of higher education in India. It shows what a committed teacher, though endowed with limited resources but with a will to serve the community, may be able to achieve.

The book contains abstracts of 80 researches done in the field of human development by the Department of Home Science at the University of Rajasthan and the Banasthali Vidyapith. Credit goes to the teachers, who inspired the young students entrusted to their care, to undertake these studies and formulate their views on the issues raised. As stated by Grover, the researches are focused on infancy, childhood and adolescence. Specific areas covered by these studies include physical, cognitive, emotional and social development of children, child care problems, parenting, family planning, mental health, achievement motivation, aspirations of parents and children, vocational interests of rural and urban children, etc. It may be noted, however, that these study areas overlap and are far from being mutually exclusive.

Human development encompasses within its field of study development of a person from "womb to tomb". As classical Indian literature portrays, a good deal of scientific study was done in this area by the ancients, but over the lapse of centuries, vicissitudes of history spread a cover of haze, as it were, on academic researches in this field.

Swami Dayananda's magnum opus, *Satyartha Prakasha* (1882) would appear to be the first serious study of the issue of human development in the age of Renaissance that marked Indian thought in the 19th century A.D. Dayananda (1824-83) laid emphasis on the education of the parents, particularly the mother, for the better growth of the child. He asked for strict observance of the four stages (*ashramas*) of life for healthy individual growth and harmonious social relationship. He was closely followed by Swami Vivekananda (1863-1902) who

UNIVERSITY OF DELHI

Advt. No. Estab. IV/145/96

Applications on the prescribed form are invited for a post of the **REGISTRAR** of the University in the scale of pay of Rs. 4500-150-5700 200-7300 so as to reach **the Registrar, University of Delhi, Delhi-110 007 latest by June 7, 1996.**

ESSENTIAL QUALIFICATIONS :

A postgraduate degree with atleast 55% marks or its equivalent grade; Atleast 15 years of experience as Lecturer/Reader of which eight years should be in Reader's grade with experience in Educational Administration.

OR

Comparable experience in research establishments and other institutions of higher education.

OR

15 years of administrative experience of which eight years as Deputy Registrar or an equivalent post.

The appointment may be for a tenure of five years which could be renewed for further similar terms or on permanent basis. The prescribed educational qualifications may be suitably relaxed in respect of such internal candidates who have a very long administrative experience and outstanding record of performance.

The prescribed application form etc. can be had from **Estab.IV Section (Room No. 205), New Administrative Block, University of Delhi, Delhi-110 007,** from 09:30 am to 12:30 pm and 02:00 pm to 05:00 pm either personally or by sending a self-addressed envelope (size 13 cms x 28 cms) with postage stamps worth Rs. 8/- addressed to the **Registrar, University of Delhi, Delhi-110 007.**

(PROF. S.K. WASAN)
REGISTRAR

May 2, 1996

**Former Vice Chancellor, Rajasthan Agricultural University and Gurukula Kangri Vishwavidyalaya,*
A-15-A, Vijai Path, Jaipur - 302 004.

laid equal emphasis on man-making education in his writings and discourses. Interestingly, Carl Jung also divides life into 4 stages : childhood, youth, middle life and old age. Carl Jung compared human life with the journey of the sun through the sky. The morning sun is the youth climbing towards the zenith. Early afternoon sun is the middle life, heading for the sun-set — the evening of life.

It need hardly be stressed that at the university stage, a student is not to receive ready-made answers. Rather, he must be ready to explore his own answers to problems and evaluate available alternatives in a given situation. The best teaching methodologies at this stage will obviously have to centre round the enquiry of discovery approach, problem-solving and game-role playing. It is gratifying to note that Grover and her learned colleagues have done exactly this.

The enquiry or discovery approach in learning would normally consist of the following 7 steps: 1. Defining a problem; 2. Formulating the hypotheses; 3. Gathering data; 4. Reporting data/findings; 5. Testing the hypotheses; 6. Formulating a conclusion; and 7. Stating one's commitment or applying the conclusion.

Inquiry is not the discovery of an answer to be lifted from a book, but rather the development of an answer by the learner himself, based on the result of his own investigation. The teacher's role is limited to acting as a facilitator to provide content as well as factual information relating to different value positions and then leaving it to the learner to evaluate the range of options for the given issue.

One last comment and that is of the utmost importance. For whom is the book intended? Is it for the IMF or WB officials? or, readers in Oxford, Cambridge or Harvard? or, readers in Tonk (where Banasthali is situated), Bhilwara or Sikar? In this perspective, a Hindi version is needed. It is time, we shed off our inferiority complex *vis a vis* English and did our teaching, research and extension in Hindi. How do we reach our target audience if we do not communicate at their comprehension level? European nations marched rapidly towards renaissance and post - renaissance after they adopted their local vernaculars. English may well be treasured as our window on the world, and so may the other foreign languages. But we must address our own people through the media which they understand.

GURU JAMBHESHWAR UNIVERSITY

HISAR (HARYANA)

ADMISSION NOTICE - 1996-97

Applications are invited for admission to the following professional and Job oriented courses for the session 1996-97.

M.Tech. Courses:

1 Computer Science & Engineering 2. Environmental Sciences & Engineering

M.Sc. Courses:

1 Mass Communication 2. Environmental Sciences 3. Applied Mathematics 4. Industrial Chemistry 5. Artificial Intelligence 6. Laser Technology 7 Applied Physics 8 Information Science & Technology 9. Applied Psychology

Master Courses:

1 Master of Computer Applications 2. MBA 3. MBA (Marketing), 4 MBA (Finance) 5. MBA (International Business) 6 Master of Business Economics (MBE)

M.A. Courses:

1 Public Administration 2 Hindi 3 English

P.G. Diplomas:

1. Advertising Management 2. Food Processing & Technology 3 Actuarial Science & Insurance

AND

1 B Tech. Printing Technology 2. LL.B. (5 yr. Integrated Course), 3. B Pharmacy 4. Diploma Aquaculture

Admission to all the courses (except M.Tech.) shall be made through entrance test and on the basis of past academic record.

Hand Book of Information (HBI) containing details of eligibility conditions, number of seats, admission schedule, application form, etc. can be obtained from the sale counter of the University on cash payment of Rs. 50/- or by sending applications alongwith bank draft for Rs. 60/- drawn in favour of Registrar, Guru Jambheshwar University, Hisar payable at Punjab National Bank (branch code No. 203) and a self addressed envelope of 8"x12"size. Mention the name of the course for which admission is sought if requesting HBI by post.

Some seats are reserved for NRI and Sponsored candidates, the details of which are available in the Hand Book of Information.

REGISTRAR

CURRENT DOCUMENTATION IN EDUCATION

A list of select articles culled from periodicals received in the AIU Library during April 1996

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Swamiraj, D. (1995). Higher education in the 21st century : Some key issues. **J of Hr Edn** 18(4), 585-93.

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EDUCATIONAL RESEARCH

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UNIVERSITY OF PUNE

STATE ELIGIBILITY TEST (SET)

To be eligible for appointment as Lecturer in faculties of Arts, Social Sciences, Commerce, Science, Law and Education in Universities and Affiliated Colleges in Maharashtra, it is essential to clear NET of UGC or SET of Govt. of Maharashtra. University of Pune, as State Agency, would conduct FOURTH SET at S.N.D.T. (South Mumbai), Mumbai (Kalina), Pune, Kolhapur, Nasik, Jalgaon, Aurangabad, Nanded, Amravati, Nagpur, Solapur, Chandrapur and Goa (Talegao Plateau) centres, which was Scheduled on **Sunday, 3rd March 1996 will now be held on Sunday 28th July 1996 in:**

Marathi, Hindi, English, History, Economics, Philosophy, Psychology, Sociology, Politics, Defence and Strategic Studies, Home Science, Library and Information Science, Journalism and Mass Communication, Social Work, Mathematics, Statistics, Physics, Chemistry, Botany, Zoology, Geology, Geography, Computer Science, Microbiology, Electronics Science, Bio-Chemistry, Commerce, Law, Education and Physical Education.

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Last Date : **Distribution** : **25th May 1996**

Submission : **31st May 1996.**

Advt. No.: 13
Date: 26/4/96

Subhaschandra Bhosale
Registrar and Member Secretary (SET)

ALAGAPPA UNIVERSITY, KARAIKUDI
DIRECTORATE OF DISTANCE EDUCATION

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(2) Bachelor of Library and Information Science (B.L.I.S.)	1 year	Any degree from a recognised University.	Karaikudi only.
II. POST GRADUATE COURSES:			
(3) Master of Corporate Secretaryship (MCS)	2 years	Any degree from a recognised University.	Karaikudi/Madras/ Coimbatore.
(4) Master of Women's Studies (MWS)	2 years	Any degree from a recognised University. Men can also apply.	Karaikudi only.
(5) Master of Bank Management (MBM)	2 years	Any degree from a recognised University	Karaikudi/Madras.
(6) Master of Commerce (M.Com.)	2 years	B.Com./BBA/B.A Co-operation, Corporate Secretaryship or any degree with Commerce/Accountancy as an ancillary subject.	Karaikudi only.
(7) M.Sc. (Industrial Mathematics)	2 years	B.Sc. Mathematics/Applied Mathematics/Statistics/ Applied Science.	Karaikudi/Madras.
III. P.G. DIPLOMA COURSES:			
(8) Computer Applications (PGDCA)	18 months	Any degree from a recognised University or AMIE/ Grad IETE	Karaikudi/Madras
(9) Personnel Management and Labour Laws (PGDPM&LL)	1 year	Any degree from a recognised University	Karaikudi/Madras
(10) Sports Management (PGDSM)	1 year	Any degree from a recognised University with an aptitude for sports.	Karaikudi only.
(11) Digital Instrumentation (PGDDI)	1 year	B Sc. Physics as Major or ancillary/allied subject/ B.Sc. applied science/BE/B.Tech.	Karaikudi only
(12) Computer Systems and Management (PGDCS&M)	1 year	Any degree from a recognised University.	Karaikudi only.
(13) Capital Market and Investment Analysis (PGDCM&IA)	1 year	Any degree from a recognised University.	Karaikudi/Madras
(14) Insurance Management (PGDIM)	1 year	Any degree from a recognised University	Karaikudi/Madras
(15) Finance and Control (PGDF&C)	1 year	Any degree from a recognised University.	Karaikudi only.
(16) Business Management (PGDBM)	1 year	Any degree from a recognised University.	Karaikudi only
(17) Industrial Water and Waste Water Treatment (PGDIW&WWT)	1 year	Any degree from a recognised University equivalent in Science/Engineering/Technology subjects with Chemistry as major/ancillary/elective/optional subject.	Karaikudi only
(18) Temple Arts	1 year	Any degree with Tamil as major language.	Karaikudi only
IV. DIPLOMA COURSE:			
(19) Computer Applications (DCA)	2 years	A pass in Higher Secondary or Pre-University or Engineering Diploma or equivalent.	Karaikudi/Madras

Application form and prospectus can be had from **THE DIRECTOR, DIRECTORATE OF DISTANCE EDUCATION, ALAGAPPA UNIVERSITY, KARAIKUDI, TAMILNADU-623 003** by sending a requisition along with a crossed demand draft for Rs. 55/- drawn in favour of the REGISTRAR, ALAGAPPA UNIVERSITY *payable on any bank at Karaikudi and by mentioning the name and address of the candidate on the reverse of* the demand draft. The requisition should clearly mention the name of the course for which application form is required with a self-addressed stamped envelope for Rs. 3/- (size 25cm. x 12cm.). Payment in any other from except demand draft will not be accepted.

NOTE:

(1) The students undergoing regular P.G. courses are also permitted to enroll for BLIS and P.G. Diploma courses concurrently. The students undergoing degree courses can enroll for Diploma in Computer Applications.

(2) The University reserves the right to limit the strength and to conduct the course.

(3) The University has no agents and applications sent through them will be summarily rejected.

(4) The Personal Contact Programme centres notified are only provisional and subject to enrolment of candidates.

Spot Admission will also be made for all the above courses in the following centres, if the applicants submit in person along with their applications, the necessary original certificates, demand draft for the prescribed fee and two copies of their recent photographs (4cm. x 3cm.). The spot admission is provisional and subject to confirmation later.

1. Directorate of Distance Education,- On all working days till the last date
Alagappa University, Karaikudi.
2. S.V. High School, Tirupati - From 15th May to 30th May
3. St. Alphonsa College of Education,- From 15th May to 30th May.
Vengal Rao Nagar, Hyderabad-38.

***Last date for the issue of applications* : 20th Sep. 1996**

Last date for the receipt of filled-in applications : 30th Sep. 1996

REGISTRAR

CLASSIFIED ADVERTISEMENTS

GURU JAMBHESHWAR UNIVERSITY HISAR

ADVT. NO. 4/96

Applications (8 copies) are invited for the following posts on the prescribed form obtainable on payment of Rs. 50/- in cash on counter from the office of the Assistant Registrar (Estt.), or by post through Demand Draft in favour of the Registrar accompanied by a self-addressed envelope of 9"x4" stamped for Rs. 8/- :-

1. Professor (Pharmaceutical Sciences) :1 (Rs. 4500-7300)
2. Reader (Pharmaceutical Sciences) : 1 (Rs. 3700-5700)
3. Lecturer (Pharmaceutical Sciences) : 1 (Rs. 2200-4000)
4. Librarian : 1 (Rs. 4500-7300)
5. Placement Officer (for all Depts.) : 1 (Rs. 3700-500 + 400 S.P)
6. Training & Placement Officer : 1 (Dept of Business Management) (Rs. 2200-4000)

Applications of the candidates fulfilling qualifications (UGC qualifications for teaching posts) as available with the application form for these posts accompanied by a demand draft of Rs. 200/- for posts No. 1 & 4, Rs. 150/- for posts No. 2 & 5 and Rs 100/- for post No. 3 & 6 in favour of the Registrar, Guru Jambheshwar University, Hisar should reach the Assistant Registrar (Estt.) by 31.5.96, through proper channel from those in employment. SC/ST, BC & ESM are exempted from the application fee. Age limit for non-teaching posts is 50 years. Number of posts can vary. The applications not on the prescribed form or incomplete or those received late are liable to be rejected. Those who have already applied against advertisement No. 2/96 for the above posts at No. 1, 2, 3 and 4 need not apply again.

Vivek Joshi, IAS
REGISTRAR

UTKAL UNIVERSITY

VANI VIHAR, BHUBANESWAR,
ORISSA - 751 004

Advertisement No. Estt. I/1041-C/ Vol.-VII/6973/96, dtd. 12.4.96

Applications in prescribed form invited for the following posts.

Analytical & Applied Economics
  L-2 (S.T.-1 (Mathematical Economics) S.C.-1)
Botany
  L-2 (S.T.-1*, S.C-1), L-1 Leave Vacancy.
Business Administration
  L-3 (S.T.-1 (M.B.A./M.A. in General/ Industrial Psychology, SEBC-1 (MBA/Master's in Statistics, Mathematics with Statistics))
Chemistry
  L-1 (S.T.- Theoretical Chemistry)
Commerce
  P-1, L-2 (S.T.-1, SEBC-1), L-1 (S.T.) in D.C.C.
Computer Science and Application
  L-3 (S.T.-1, S.C.-1)
English
  P-1, L-2 (S.T.-1), L-3 (S.T.-1) in D.C.C.
Geography
  P-1, R-1, Temporary, L-3 (ST-1, SC-2)
Geology
  P-1 Tata Chair (Industrial Minerals), R-1.
History
  R-2 @*, L-1 in D.C.C.
Law
  P-cum-Principal-1, M.S. Law College L-3 (S.T.-1, S.T.(W)-1) in Law College.
Library & Inf. Science
  L-1 (S.T.)
Mathematics
  R-1, L-1 (S.T.), L-1 in D.C.C.
Physics
  L-2 (S.T.-1, S.C.-1)
P.M. & I.R.
  L-1 (S.T.)
Political Science
  L-1 (S.T.) in D.C.C.
Psychology
  L-1 (S.T.)
Sanskrit
  [L-2 (S.T.-1 (Vedic Literature), S.C.-1)]
Zoology
  P-1 Lein vacancy, R-1*

P = Professor, R = Reader, L = Lecturer* = subject to U.G.C. approval.

BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE

PILANI, (RAJASTHAN) 333 031

FACULTY RECRUITMENT ADVERTISEMENT NO. FR/3/96.

Applications are invited for positions of Professors, Associate Professors and Assistant Professors in Chemical, Civil, Electrical and Electronics, Mechanical, Software Engineering, Computer Science, Pharmacy, Biotechnology, Management and Economics.

Some positions of Lecturers are also available in Humanities, Social Sciences, Biotechnology, Physics, Mathematics, Chemistry and English. Candidates for Lecturership should normally be a PhD. Candidates with M.E. in any engineering discipline may also be considered for the positions of Assistant Lecturers with simultaneous provision of work for PhD. Higher cadres and higher starting salaries possible for deserving candidates.

A free booklet **"Introducing BITS to Prospective Faculty"** giving details and prescribed format or application can be obtained by sending a pre-stamped (Rs. 8.00) self-addressed envelope (30x25 cm) marked FR / 3 / 96 alongwith a brief biodata giving age, qualifications and experience etc. to the Registrar.

PILANI **REGISTRAR**
May, 1996.

separate call letter for interview will be issued. Hence candidates should report for the Interview along with the original certificates/Marksheet in support of their educational qualifications

Notes :-

a. Pay and allowances for Principal and Lecturers having extra qualifications and experiences are negotiable

b No TA/DA will be admisible for the candidates for appearing at the interview.

Address for correspondence :-

Rev L.K. Tsanglao,
Convenor,

Organising Committee

C/0 Wokha Town Baptist Church

Post Box. No 10, Wokha - 797111,
Nagaland

St. Dominic's College,

Kanjirapally, Parathode 686 512,
Kottayam Dt., Kerala.

WANTED

1. Lecturer in Mathematics - Substantive vacancy 3 (Open Merit · 2 Community Merit : 1)
2. Lecturer in Physics - Leave vacancy 2 - Open Merit (Likely to be permanent)
3. Lecturer in Zoology - Leave vacancy - 1 - Open Merit

Age & Qualifications:

As per Government, University and UGC rules and regulations.

Appointees will not have any claim for appointment to the vacancies in the UGC Scheme. They shall be prepared to teach in the Pre-Degree level and they will be included in the Pre-Degree category

Applications, in the prescribed form can be had from the College Office on payment of Rs. 100/- should reach the undersigned **within 30 days** of this notification.

MANAGER

CENTRAL INSTITUTE OF FISHERIES EDUCATION

(Deemed University)
(I.C.A.R.)
Versova, Mumbai-400 061.

CORRIGENDUM

It has been decided that 25% of the seats for M.F.Sc and Ph.D, against advertisement notice published in *University News* dated February 26, 1996 and March 11, 1996 respectively shall hencetorth will be filled up by Indian Council of Agricultural Research, New Delhi through their JRF and SRF All India Entrance Examinations respectively.

AMERICAN STUDIES RESEARCH CENTRE

Hyderabad

Guiding Research in International Relations
A Series of Workshops

With a view to enhance the study of international relations in India, the ASRC and the host universities are organising several Workshops for Research Guides. They are designed to provide an opportunity for those guiding research leading to M.Phil and Ph D degrees in the field of international relations (broadly defined) to exchange ideas on research (methods, topics, guidance, source materials, writing, etc). discuss procedures and regulations for registration, and also for updating their acquaintance with recent research trends and published work in the field

VENUES . Baroda (September). New Delhi (October). and Udaipur (November). Manipur (November) and Pondicherry (December) 1996

DURATION Two Days **DATES** : To be fixed

NUMBER OF PARTICIPANTS Usually 25 to 30 research guides are invited.

ELIGIBILITY · Recognised research guides who have guided/registered *at least two* M Phil/Ph D. scholars under their supervision are eligible to apply. Proximity to the venue concerned will be the criterion for placement of the selected participants

DEADLINE Last date for receipt of letters of interest is *one month* prior to the scheduled month of the workshop concerned

ACCOMMODATION Selected outstation participants will stay and take their meals in the hostel/guest house of the host university

TRAVEL EXPENSES . Round trip train fare by first class/A C. sleeper will be reimbursed. The relevant ticket is needed for reimbursement Rs 100/- per 24 hours of travel time is paid to cover local transport and other incidental charges

If interested, please send your latest C V. along with the titles of the dissertations completed under your supervision, the year(s) of the award of M.Phil /Ph.D. degrees and a list of scholars currently working with you, along with their topics of research and dates of registration. Send you letters to

Dr. B. Ramesh Babu, Senior Academic Fellow (IR)
American Studies Research Centre, Hyderabad 500 007
Tel: 7018606/7018609 Fax: 040-7017114
E.mail babu @ asrc hyd. ernet. in

VISVA-BHARATI
SANTINIKETAN

Admission Notice for academic session 1996-97

VIDYA-BHAVANA (INSTITUTE OF HUMANITIES & SOCIAL SCIENCES)

1. Two-year M.A. courses in Bengali, English, Sanskrit, Hindi, Oriya, Indo-Tibetan, Chinese, Philosophy, Comparative Religion, Economics, History, Ancient Indian History Culture & Archaeology, Geography and Mathematics.
2. Three-year B.A. (Honours) Courses in Bengali, English, Sanskrit, Hindi, Oriya, Philosophy, Comparative Religion, Economics, History, Ancient Indian History Culture & Archaeology, Geography and Mathematics.
3. Four-year B.A. (Honours) Course in Chinese.

SIKSHA-BHAVANA (INSTITUTE OF SCIENCE)

1. Two-year M.Sc. courses in Physics, Chemistry, Mathematics, Zoology and Botany.
2. Three-year B.Sc. (Honours) courses in Physics. Chemistry, Mathematics, Zoology (Life Science) and Botany (Life Science).

SANGIT-BHAVANA (INSTITUTE OF MUSIC AND DANCE)

1. Two-year M. Mus. Courses in Rabindra-Sangit, Hindustani Classical Music (Vocal, Instrumental — Sitar and Esraj), Katha-Kali, Manipuri Dances, Tabla and Pakhawaj.
2. Four-year B.Mus Courses with any two of the following subjects (specialisation *in any one* subject only at the part-III level) Rabindra-Sangit, Hindusthani Classical Vocal Music, Sitar, Esraj, Tabla, Pakhawaj, Kathakali Dance, Manipuri Dance and Drama (Details of combination will be available in the hand-out).
3. Two-year special Degree Courses in subjects at Serial No. 2 above (excepting Drama).
4. Four-year Diploma Courses with *any two* of the subjects at Serial No. 2 above (excepting Drama).
5. Four-year Senior Certificate Course in subjects at Serial No. 2 above (excepting Drama)

KALA-BHAVANA (INSTITUTE OF FINE ARTS & CRAFT)

1. Two-year M Fine Arts (MFA) Courses in Painting, Sculpture, Graphic Art (Print Making), History of Arts and Design (Textile & Ceramics).
2. Two-year Advanced Diploma Courses in Painting, Sculpture, Graphic Art (Print Making) and Design (Textile and Ceramics).
3. Five-year B. Fine Arts (Honours) (BFA) Courses in Painting, Sculpture, Graphic Art (Print Making), Design and History of Art.
4. Five-year Diploma Courses in Painting, Sculpture, Graphic Art and Design.
5. Two-year Certificate Course in Design.

PALLI SIKSHA-BHAVANA (INSTITUTE OF AGRICULTURE)

1. Two-year M.Sc. (Ag.) Courses in Agronomy, Plant Protection, Agricultural Extension and Soil Science & Agril Chemistry.
2. Four-year B Sc (Ag.) (Honours) Course in Agriculture.

PALLI SAMGATHANA VIBHAGA (INSTITUTE OF RURAL RECONSTRUCTION)

1. Two-year M.A./M.Sc. Course in Anthropology.
2. Two-year M A. Course in Rural Development.
3. Two-year M S.W. Course in Social Work.
4. Three-year B S.W. (Honours) in Social Work.
5. Three-year Diploma Courses in Crafts in the Subjects -
   - (i) Diploma in Wood Work.
   - (ii) Diploma in Handloom Weaving

TAGORE STUDIES — A compulsory course for all Under Graduate Students.

UTTAR SIKSHA SADANA (HIGHER SECONDARY SECTION)

Two-year Pre-Degree (10+2) Course in Arts and Science Stream.

Admission of Scheduled Castes/Scheduled Tribes and Physically handicapped candidates will be governed as per rules of the Government of India. T.A. as per rules will be granted to candidates called for admission test for post-graduate courses. SC/ST candidates will be paid T.A. as per rules stipulated for them.

Detailed eligibility criteria for admission to different courses are displayed in the Notice Board of respective Institute.

Prospective candidates may however, enquire from the Principal (Adhyaksha) of the Institute concerned about the minimum marks required for admission to a course. Handout bearing eligibility conditions for admission and details of course curricula and prescribed Application Form for admission may be obtained from the respective Adhyakshas (Principal) of the Institute concerned on application in plain paper which should be accompanied by a Crossed Indian Postal Order for Rs. 12/- issued in favour of the "Accounts Officer, Visva-Bharati" and payable at Santiniketan Post Office and also a self-addressed envelope (23 cm. x 10 cm) affixed with postage Stamps worth Rs. 3/- only. Handout and Application Form may also be obtained personally from the Office of the Institute concerned on production of a Cash Coupon for Rs. 12/- only to be procured from the Accounts Officer, Visva-Bharati at Santiniketan or from the Assistant Accounts Officer, Visva-Bharati at Santiniketan. Application on prescribed form, completed in all respects and supported by attested copies of required marksheets, certificates, documents etc. should reach the Adhyaksha (Principal) of the Institute concerned within the stipulated date. Candidates willing to apply for more than one Course/ Stream should apply separately. Incomplete applications are liable to be rejected. Rights of cancellation or selection/admission lie with the Admission Committee of the Institute concerned. The University reserves the right to limit the number of eligible applicants to be called for admission test. Last dates for receipt of application in prescribed forms :

(1)	All Courses of Kala-Bhavana and Sangit-Bhavana.	: June 15, 1996.
(2)	M.A./M.Sc., M.Sc. (Ag.), M.S.W., M.A./M.Sc. (Anthrop.)/M.A. (R.D.)	: June 30, 1996.
(3)	B.A. (Hons.)/B.Sc. (Hons.)/ B.Sc. (Ag.) Hons./B.S.W. (Hons.)/ Diploma in Crafts	: 2nd July, 1996 or 15th day from the date of publication of results of the Higher Secondary Examination of the W.B. Council of Higher Secondary Education of 1996 and Pre-Degree of Visva-Bharati of 1996, whichever is later.
(4)	Pre-Degree Course	: 30th June, 1996 or 15th day from the date of publication of results of Madhyamik Pariksha of the Board of Secondary Education, West Bengal, 1996 and S C. Examination of Visva Bharati, 1996, whichever is later.

N.B. Visva-Bharati remains closed on Tuesday afternoon and Wednesday (Weekly holiday).

REGISTRAR

DECCAN COLLEGE

Postgraduate and Research Institute
(Deemed to be a University)
PUNE - 411 006.

ADMISSION TO POSTGRADUATE PROGRAMMES

Applications are invited for admission to the following postgraduate courses for the academic year 1996-97.

These courses are open to regular students only.

I) M.A. (Master of Arts)

Duration : 2 years (4 Semesters)
No. of seats: 25 for each subject
Eligibility : Minimum remarks ar B.A. — 55%, at B.Sc.— 60% (relaxable for reserved category candidates by 5%)
Subjects: 1) Ancient Indian History, Culture & Archaeology
2) Linguistics.

II) M.Phil. (Master of Philosophy)

Duration : 1 year (2 Semesters)
No. of seats: 10
Eligibility : Minimum marks at M.A.— 55%, at M.Sc.— 60%
Subject : Ancient Indian History, Culture & Archaeology

III) Ph.D. (Doctor of Philosophy)

Duration : Minimum - 2 years; Maximum - 6 years
No. of seats: 20 for each subject per academic year
Eligibility : Minimum marks at M.A./M.Phil.— 55%, at M.Sc. — 60%
Subjects : 1) Archaeology, 2) Linguistics.

Application forms and prospectus can be obtained by hand for Rs. 100/- or by post for Rs. 130/- (Demand Draft drawn in favour of the Registrar). Completed forms for M.A./M.Phil. courses will be accepted upto **15th June 1996**. Admission to the Ph.D. course is open throughout the year.

Notification No. 39 **REGISTRAR**

Published by SUTINDER SINGH, on behalf of the Association of Indian Universities, AIU House, 16 Kotla Marg, New Delhi-2.
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